IDG.net

NDS SCALES UP Novell's Michael Simpson says the firm is readying a dramatically more scalable directory. Page 6.

TAKING IT ON THE CHIN Microsoft's Jim Allchin is battered by DOJ lawyers for a faulty Windows videotape. Page 14.

The newsweekly of enterprise network computing

NetworkWorld

February 8, 1999 Volume 16, Number 6

Breaking news and more: www.nwfusion.com

One righteous RBOC

Bell Atlantic's Farina: Being just an RBOC isn't good enough.

Page 25.

NOVELL REBORN

STEVE BORNS

CEO Eric Schmidt and a timely directory strategy will propel the company back to prominence.

BY SUSAN BREIDENBACH

Directory-enabled networking will define computing in the 21st century, and Novell has once again staked out a position in the forefront of a major technology movement. This time, the company appears poised to seize the day instead of giving ground.

Novell Directory Services (NDS) has been evolving for 10 years into a mature, robust cross-platform system that many argue is the only enterprise-capable directory game in town. It is certainly the only global directory that boasts an installed base closing in on 50 million seats.

See **Novell**, page 39

Wall St. wary of Cabletron's future

BY JIM DUFFY

ROCHESTER, N.H. — As the network industry rockets into the new millennium and the age of convergence, it may be leaving behind one of its former stars.

A "mid-quarter" conference call with company executives last week failed to persuade some Wall Street analysts that Cabletron isn't fading from view. They came away unconvinced that Cabletron can turn its fortunes around anytime soon despite the following developments:

- A new advertising campaign to stem defections to Cisco.
- The shipment of product to Compaq for resale.
- The discontinuation of some product lines.

Analysts now believe that Cabletron is not a prime acquisition candidate, and will remain an independent company for some time. Cabletron

See **Cabletron**, page 57

IBM gets serious about Ethernet

Firm injecting ATM technology into Ethernet gear.

BY MARC SONGINI

RESEARCH TRIANGLE PARK, N.C. — IBM is ready to unleash a line of high-speed Ethernet switches that will boast quality-of-service (QoS) capabilities typically found only in ATM gear.

Big Blue is also adding directory-based policy management technology to its router and switch lines, making it easier for companies to prioritize access to net resources.

The moves are designed to make IBM a more significant player in the Ethernet market. Until now, IBM has focused largely on Token-Ring and ATM switching technologies.

"We expect to grow our Ethernet business at three times the industry rate this year," said Rob Zimmer, director of strategy for IBM's Networking Hardware Division at the

See **IBM**, page 56

More Online

- Get a technical overview of the Prizma chip at the heart of IBM's effort.
- A plain English guide to QoS.

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Monster.com's Super Bowl play pays off in a big way

BY PAUL MCNAMARA

Monster.com CEO Jeff Taylor made two big bets on the Super Bowl.

The first was spending $4 million for three 30-second TV ads that he hoped would make his electronic job-search business a household name. The second was buying $700,000 worth of new network muscle — 30 Dell servers and a T-3 pipe — to prevent that name from becoming mud.

Taylor claims to have won big-time on both scores, as Monster.com's traffic last week shattered previous highs with nary a hiccup on the network.

"There's been no second-guessing at all about our decision," says Taylor, whose Maynard, Mass., company employs 305 people and

See **Monster.com**, page 56

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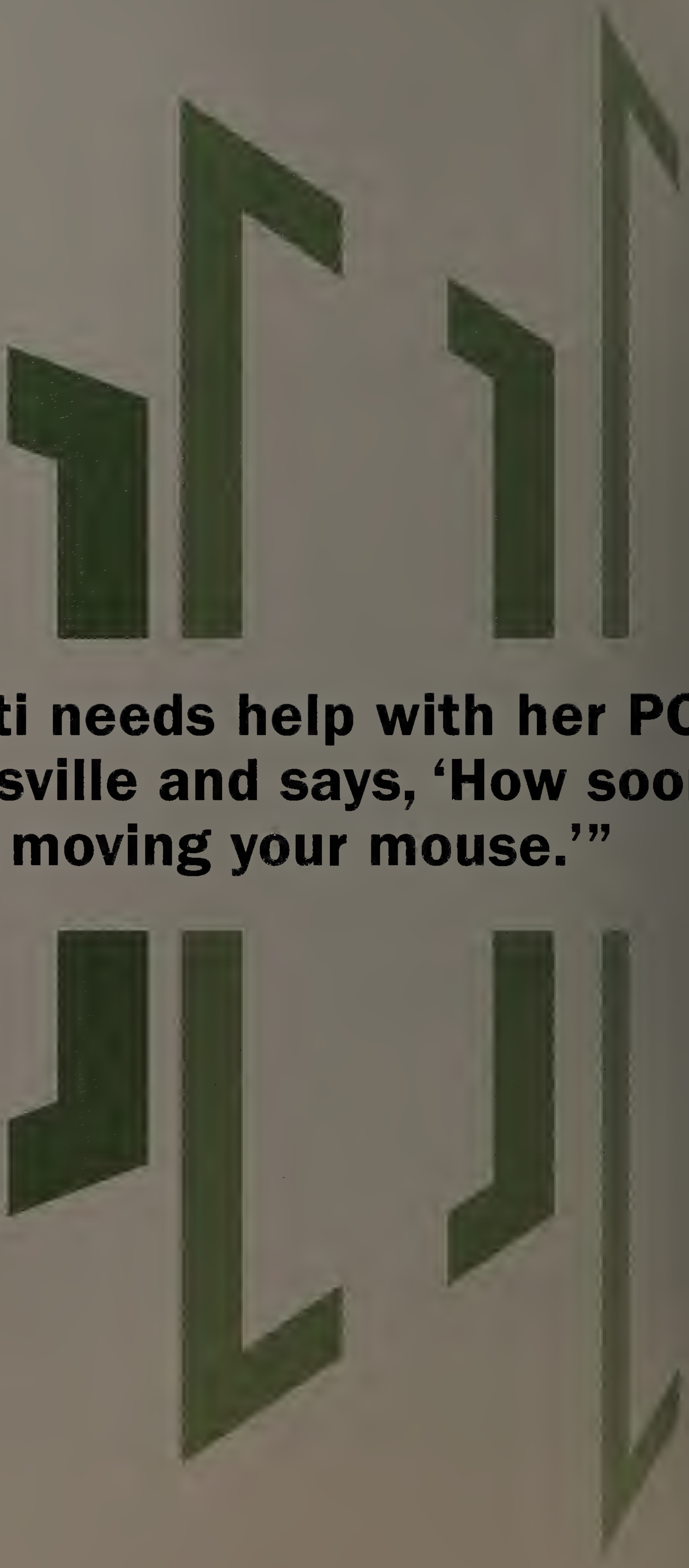
SHAWN HENRY

Jeff Taylor, CEO of Monster.com, says his firm revamped its network to handle increased traffic sparked by the company's Super Bowl ads.



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headquarters in Louisville and says, ‘How soon can
‘Right now, that’s me moving your mouse.’”

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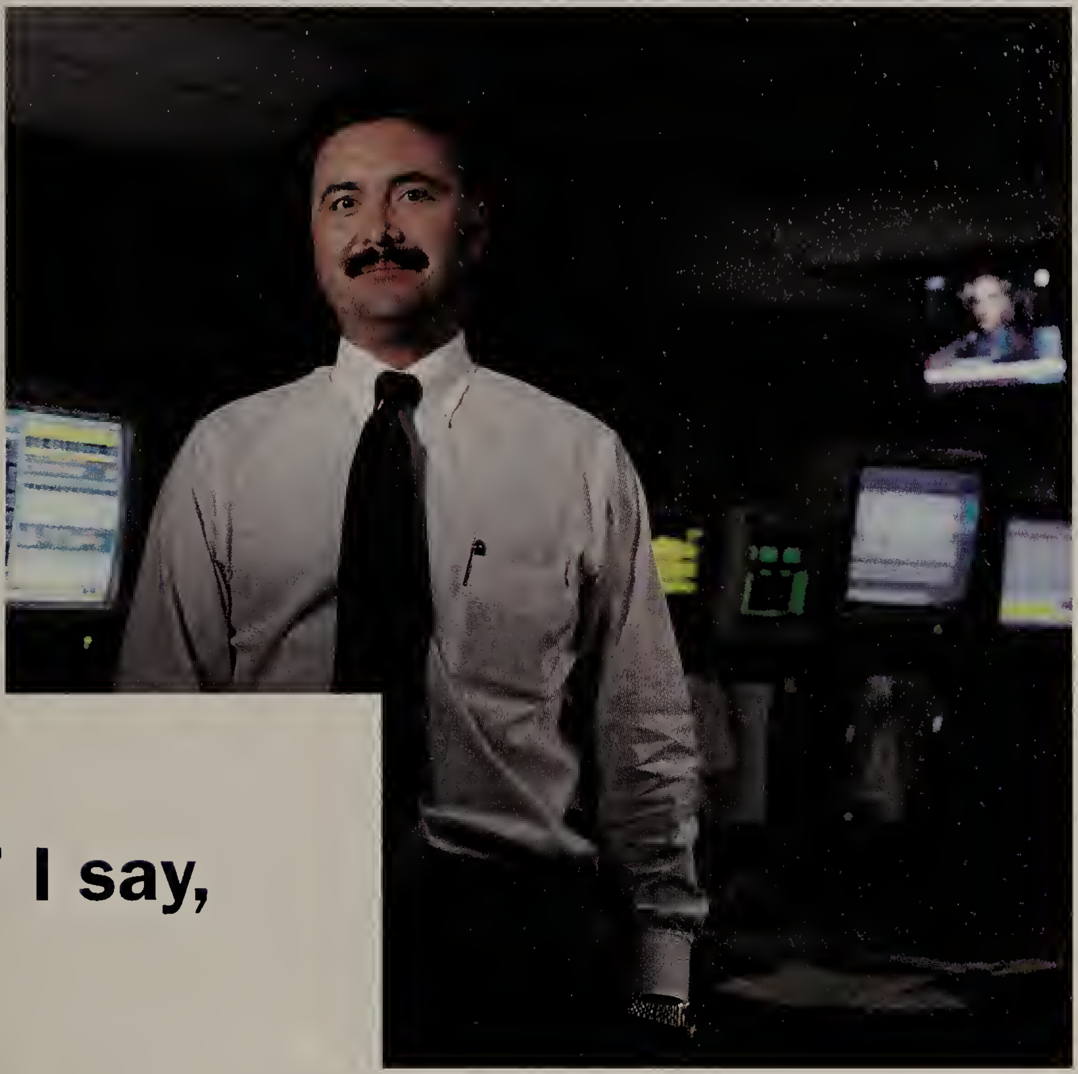
you be here?' I say,



"Moving cursors in faraway places is great, but there's more to the centralized management we get with Microsoft® Windows NT® on Dell® PowerEdge® servers. Like last night we were sitting right here, but we checked Y2K readiness on our desktops in Evansville. To get started, we did a remote inventory with Systems Management Server, and we used Dell OpenManage™ to dig a little deeper on the hardware side. It's surprisingly easy. Lately, the only reason for me to leave Louisville is vacation."

Jeff Polsgrove, CTO
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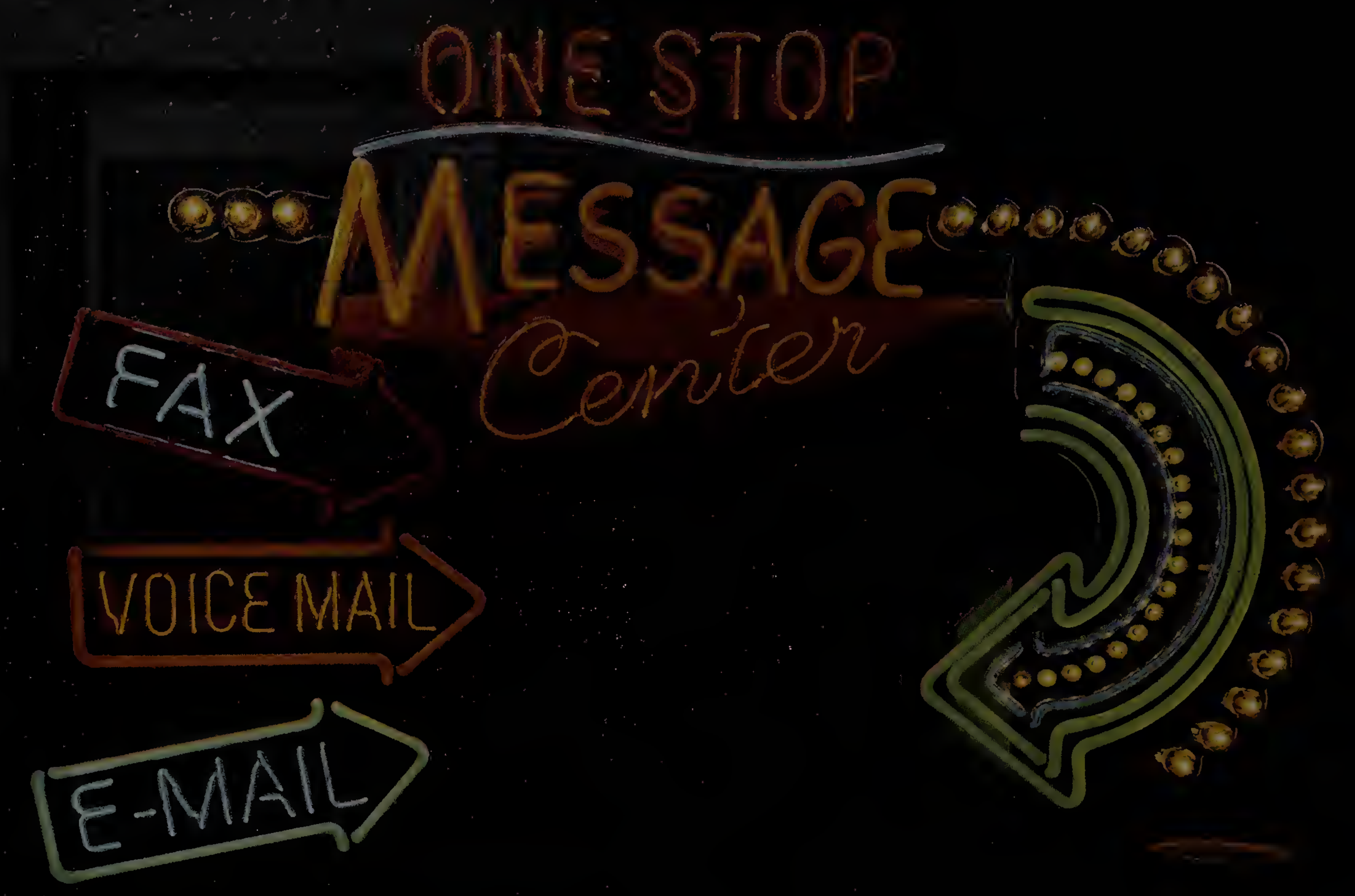

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THIS WEEK ONLINE

No foolin'. Web sites just keep getting more and more complex. How do you keep yours from collapsing? You could learn a thing or two from the folks who run The Motley Fool's Web site — one of the more popular and feature-laden sites on the World Wide Web. In a new biweekly column on Network World Fusion, see how the company does it. Join Dwight Gibbs, chief technical fool for The Motley Fool, and Keith Pelczarski, mad scientist of The Fool's production department, as they explain how they keep the site running and how you can avoid the mistakes they have made along the way. **DocFinder: 1440**

Web database. Speaking of running a complex site, a Fusion user is seeking guidance on converting a site consisting entirely of static HTML pages into one driven by a database. Any suggestions? Come online and bring your ideas. **DocFinder: 1443**

Windows bug? A Fusion user reports a pesky problem with the TCP/IP stack in Windows 9.X clients that can cause excessive network congestion. Read his description, then jump in with your comments. **DocFinder: 1441**

Water cooler. Who would have known that women have special emotional needs when it comes to the Year 2000 problem? Fusion Editor Adam Gaffin takes a look at the Y2K for Women site — which includes tips on protecting your family from Y2K rioters. He also finds a lot of the hysteria would have been familiar to the people awaiting the apocalypse on Dec. 31, 999. **DocFinder: 1442**

How to get onto Network World Fusion

Click on Register on the home page and follow the instructions. Subscribers, keep your NWF number — highlighted on the front cover's mailing label — handy during registration. Nonsubscribers must fill out an online registration form.

NetworkWorld

Table of Contents

FEBRUARY 8, 1999

Steve Schultz of DigitalNation is eager to exercise his stock options. Page 46.

NEWS

6 Novell preps mega-directory; e-commerce sites targeted.
8 HP said to be readying new network gear.
8 QoS Forum promises to improve carrier service levels.
10 Storage management standards scuffle?
11 Major banks break new Internet security ground.
12 Optical routing will set bandwidth free.
12 New phone switches do IP and promote new services.
14 The Microsoft Diaries: Software, Lies and Videotape.
14 Start-up premieres low-bandwidth TV-quality video.

INFRASTRUCTURE

17 Trading firm uses Foundry switches to control Web traffic.
17 New Cabletron stackable switch scales to gigabit speeds.
22 Kevin Tolly: A reality check on "open source" software.

CARRIERS & ISPs

25 Being an RBOC isn't good enough — Bell Atlantic wants more.
25 MCI WorldCom refreshes, repackages security.
26 David Rohde: Throwing FUD at Qwest.

ENTERPRISE APPLICATIONS

29 Auto parts distributor bets on XML for e-commerce.
29 Web site e-mail can be a black hole.
30 Scott Bradner: Identify the user, not the processor.

TECHNOLOGY UPDATE

31 Moving wireless LANs into the fast lane.
32 Gearhead: A new form for forms.

MANAGEMENT

46 Stocking up: Employers lure you with stock options.

OPINIONS

34 Editorial: AT&T is being hypocritical on access.
35 Jeff Shapiro: Advice to the new boss: Make changes slowly.
35 Linda Musthaler: Linux gets critical mass to compete with NT.
58 Backspin: Hacking away, and just barely trying.
58 'Net Buzz: Breakfast with the venture capitalist; Where to go for wireless.

Net Know-It-All ....Page 14
Ask Dr. Intranet ....Page 31
Message Queue ....Page 34
Editorial and advertiser indexes ......Page 55

Special Focus

CARRIER SERVICES

Don't wait for the big guns to deliver integrated access. Page 27.

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FEATURES

Novell Reborn

CEO Eric Schmidt and a timely directory strategy will propel the company back to prominence. Page 1.

FACE-OFF: Does Layer 4 switching warrant the hype? Alteon says the technology is for real, but Nortel claims it's only an illusion. Page 37.

REVIEW: The first batch of products to support the IEEE 802.11 wireless Ethernet standard shows promise, not perfection. Page 43.

NEWS BRIEFS, FEBRUARY 8, 1999

MCI WorldCom jumps back into 'Net biz

Cerf: MCI WorldCom has returned to the Internet game.

MCI WorldCom's exit from the Internet access market didn't last long. Almost seven months after U.S. regulators forced MCI to sell its Internet business as a condition of merger approval, MCI WorldCom last week said it would offer Internet access for $16.95 per month for current long-distance customers and $19.95 for other users.

"We're back," said Vint Cerf, the service provider's senior vice president of Internet architecture and technology.

The service will use MCI WorldCom's UUNET Internet backbone. Observers say regulators should have no problems with the new service because it will be using existing facilities, not newly acquired assets.

Qwest: Don't worry, be happy

Hard-charging long-distance carrier Qwest posted a fourth-quarter loss of $21.9 million, but Qwest executives and Wall Street analysts put a happy face on the news. Qwest President and CEO Joe Nacchio emphasized that during the quarter the company actually made an operational profit for the first time in 1998, but posted a loss only after special charges for various acquisitions and joint ventures were factored into the results.

Nacchio also boasted that the company's frame relay and ATM revenue more than tripled from the fourth quarter of 1997, and announced that the company had won a U.S. Treasury subcontract to build a giant frame/ATM network of 4,000 to 7,000 nodes. That deal will help win Fortune 500 contracts, he said: "I think people were waiting for us to demonstrate that we could step up and take a very large enterprise type of account and handle it."

Testing IT intelligence

If you've ever wondered just how competent your IT staff really is, now's your chance to find out. TeckChek, a vendor-independent technical proficiency testing service, today announced a service that lets companies test employees on everything from Windows NT to Lotus Notes. The firm's TeckChek test and Web-based results database lets clients view, compare and analyze the test results of their employees and job candidates against others in the database. The online database is designed to help managers avoid hiring mistakes and better manage their departments' IT skills. For more information, visit the site at www.teckchek.com.

Another day, another Microsoft lawsuit

A small Chicago company last week asked a federal court to bar distribution of Microsoft Windows and Internet Explorer, claiming in a lawsuit that Microsoft infringed on a broad technology patent granted to the firm late last year.

The complaint filed by Eolas Technology charged Microsoft with infringing on a patent Eolas holds for technology that lets a Web browser access interactive programs embedded in a Web page, such as plug-ins, applets and ActiveX controls. The suit claims that several of Microsoft's Web-enabled products infringe on the patent, including Windows 95 and 98, and Internet Explorer. Microsoft had no comment on the suit.

Glitches galore

Software glitches at E-Trade Securities last week stopped investor transactions and prompted New York Attorney General Elliot Spitzer to start looking into the overall Internet brokerage industry, which has come under fire from angry investors for inconsistent performance. For its part, E-Trade said the glitches came from software the company installed last week. E-Trade estimated the glitch only affected about 5% of its customers.

Microsoft? We hardly knew ye

According to a Reuters report, Microsoft Chairman Bill Gates said last week that he's worried about his company's place in history.

"Twenty years from now . . . one of the most popular soft drinks in the world, you can say with great certainty, is going to be Coca-Cola. Twenty years from now what will the most popular operating system be?" Gates asked technology conference attendees in Copenhagen. "The operating system will be so much different than anything anybody thinks today. You won't recognize it, and there is [only a slim] chance that Microsoft can reinvent itself three or four times to be there."

Gates noted that Microsoft is a company employing 30,000 people with sales of about $20 billion: "In terms of size, our shadow is bigger than our body." Referring to the group's many competitors, Gates said that part of his job as chairman is "to fear everything."

Novell preps mega-directory

NDS upgrade aimed at e-commerce sites.

BY CHRISTINE BURNS

PROVO, UTAH — Novell is prepping a new version of its directory service software that exponentially increases the number of objects any single server can hold.

Novell officials claim the scalability will appeal to customers looking to use Novell Directory Services (NDS) outside their corporate firewalls to manage access to large e-commerce sites and enable secure business-to-business communication.

NDS already has earned a formidable reputation for scaling across servers to accommodate as many directory entries as a corporation needs. Replication among servers keeps directory information synchronized.

Unlimited support

The new version of NDS — referred to internally at Novell as scalable directory services (SCADS) — will allow users to store "millions and millions" of objects on a single server, says Michael Simpson, Novell's director of marketing.

Last month at its NDS Partner Summit, Novell demonstrated SCADS supporting a terabyte of directory data, according to sources who attended the closed-door event. Novell is expected to conduct a similar demonstration at its annual Brainshare user conference next month in Utah.

SCADS' support for a seemingly unlimited number of objects is a far cry from what Novell recommends as the practical limit for the current version of NDS. Novell advises customers not to exceed 1,000 to 3,500 directory objects per server, depending on the machine and the customer.

Simpson declined to detail exactly how Novell achieved the enhanced performance in SCADS. However, industry analysts briefed on product plans say the company has swapped its proprietary database so directory objects can now be stored in more mainstream databases, such as those from Oracle, that can handle huge amounts of data.

Simpson says this kind of scalability will make NDS more suitable for use at large e-commerce sites where Netscape's Lightweight Directory Access Protocol-based directory server has captured most of the mind share.

"We've already got the other pieces in place that would let companies use NDS to have tight control over who accesses their sites and the types of experiences they have when they get there," Simpson says.

For example, NDS can hold X.509 security certificates, which a company can hand out to preferred customers so only those users have the right to access secure pages on the site.

Industry analysts say in addition to handling huge numbers of objects in NDS, Novell must also ensure that SCADS can serve up data fast.

"There is no value in having a directory database that big if you can't get at the information you need quickly," says Tim Sloane, an analyst with the Aberdeen Group consultancy in Boston.

Hard sell needed

Novell users who are committed to using NDS for controlling access to their internal network resources say the company is going to have to make a hard sell to woo them away from the e-commerce wares they've already deployed.

"We are committed to NDS inside the firewall, but we farmed out our e-commerce stuff because we needed it yesterday," says Eric Ligman, president of Supreme Software, a software and hardware reseller in Woodstock, Ill. ◪

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HP said to be readying new net gear

BY JEFF CARUSO

PALO ALTO — On the heels of its recent announcement of a Layer 3 switch, Hewlett-Packard is planning to unveil stackable 10/100M bit/sec Ethernet switches with Gigabit Ethernet uplinks, according to sources familiar with HP's plans.

Switch prices as low as $89 per 10/100M bit/sec port are also in the works, sources say.

John McHugh, general manager of HP's workgroup networks division, declined to comment on the company's plans to fill out its product line of Ethernet switches in coming weeks, saying only that the company will compete on price and ease of use.

He added that HP is working on new 10-Gigabit Ethernet technology, but commercial implementations are probably more than a year away.

HP is still a relatively insignificant player in the network equipment market, and industry observers say its recent moves don't represent any great technological leaps. The ProCurve Routing Switch 9300, a Layer 3 switch announced last month, is built on technology the company obtained from Foundry Networks. Most of the rest of HP's network hardware line is composed of low-end Ethernet switches and hubs.

HP's McHugh: We can compete on price.

The company captured less than 3% of the low-end Ethernet switch market last year, in terms of revenue and in number of ports shipped, according to Dell'Oro Group in Portola Valley, Calif.

HP faces major competition from more established network hardware vendors, according to Michael Speyer, program manager at The Yankee Group in Boston.

"HP doesn't have anything to differentiate itself other than price, and maybe some of its management software," Speyer says.

He also points out that other computer companies, such as Compaq, Digital and IBM, have been relatively unsuccessful selling network hardware.

McHugh, however, remains optimistic, saying that HP can compete on price because of the way it manufactures switches, compressing functions on very few chips.

HP will target LAN hardware specifically, avoiding WAN connections. McHugh says the company isn't looking to make any acquisitions in network hardware because it has all the products and reseller connections it needs.

One of the places in which HP is moving to the technological forefront is in 10-Gigabit Ethernet.

McHugh says the company has a prototype working now but is trying to find a way to make the technology inexpensive enough for a commercial product.

Standards activity for 10-Gigabit Ethernet is expected to begin next month, but HP won't have a commercial prototype for another four to six months. And 10-Gigabit interfaces probably won't be shipped until 2001, McHugh says.

Senior Editor Jim Duffy contributed to this story.

Quality of service grabs the spotlight

New group pledges to help carriers deliver service-level guarantees.

BY DENISE PAPPALARDO

SAN JOSE — At its inaugural meeting last week, the QoS Forum pledged to help service providers deliver guaranteed levels of service, even when network traffic crosses the Internet or multiple carriers' facilities.

Education needed

The group will develop guidelines to help carriers and ISPs meet service-level agreements that extend beyond a customer's direct connection to a service provider, says Martin Hall, chief technology officer at Stardust Forums, the company organizing the QoS Forum.

The 16 companies attending the first meeting also agreed to find ways to educate the industry on how deploying quality-of-service (QoS) technology in their networks can create new business opportunities for users and service providers. Lucent and Extreme Networks were among the companies represented at the meeting. Hall expects more users and service providers to become involved in the forum as it becomes more established.

Organizing for quality

Here is a sampling of QoS Forum members:

- 3Com
- Avici Systems
- Cisco
- Extreme Networks
- IBM
- IPivot
- IP Metrics
- IPHighway
- Lucent
- Microsoft
- Netcom Systems
- Newbridge Networks
- Fujitsu Nexion
- Nortel Networks
- Orchestream
- Qosnetics

Martin Hall, chief technology officer at Stardust Forums, the QoS Forum's organizer.

Demonstrations planned

The group plans to set up networks to demonstrate how specific applications, such as voice and fax, can benefit from QoS guarantees when traversing the Internet.

The forum is not a standards organization, but it plans to rely on standards that groups such as the Internet Engineering Task Force have established.

Another QoS-centric group, the QoS Alliance, is closely tied to the IEEE. The alliance is primarily focused on QoS in IP LANs.

The QoS Forum will meet Feb. 24 to establish specific steering groups and roll out the group's first-year plan, Hall says.

More information on the forum is available at (408) 879-8080 or www.stardust.com/qosforum. ◪

Puma ties handheld devices to corporate applications, databases

BY JOHN COX

SAN JOSE — New software from Puma Technology should simplify the work of tying an array of handheld devices to networked servers.

Software that Puma is developing under the company's Vulcan project will let users create applications for handheld devices and then use these programs to access back-end applications and databases.

Net managers realize that it's becoming increasingly difficult to standardize on the types of handheld devices end users employ to access corporate net resources. So the next-best thing is to create a standard interface between handheld applications and back-end software, says Ken Dulaney, vice president of mobile computing at market researcher Gartner Group in Stamford, Conn.

"You need a product like Puma's because users don't want to have different dial-up or connectivity procedures for each separate function they want to do," Dulaney says.

When released later this year, Vulcan initially will support the Palm Platform software on devices such as 3Com's PalmPilot. Later, Puma will support Windows CE.

Vulcan is a new version of Puma's existing device middleware, Intellisynch Anywhere. Today, Intellisynch has a server component that connects Palm devices to Microsoft Exchange Server. Puma is beta-testing a version of Intellisynch for Lotus Notes. Customers can create device applications using Puma's Satellite Forms development tools.

By contrast, Vulcan is a general-purpose middleware layer, with Satellite Forms present as an integrated feature. This means that network managers will be able to create and deploy handheld applications that can be connected — via Open Database Connectivity (ODBC) and other industry-standard interfaces — to whatever back-end server program is desired.

Vulcan initially will have an interface to Lotus Notes and an ODBC interface to access databases. The product also will let users transfer existing HTML forms in Web applications into corresponding displays in Satellite Forms.

With Vulcan, Puma will be competing with Advanced Systems Limited in Bristol, England and Riverbed Technologies in Falls Church, Va., both of which offer middleware and tools to link handhelds to corporate servers.

Puma declined to say when a commercial product based on Vulcan will be released or how much it will cost.

Puma: (408) 321-7650

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What makes the stars twinkle?
How does the Internet work?

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Storage management standards scuffle?

BY DENI CONNOR

Storage giant EMC last week helped launch the FibreAlliance, a group that hopes to dictate standards for storage-area networks (SAN).

But there is already such a group in place. In fact, there are four others, with the Storage Network Industry Association (SNIA) being the furthest along in proposing storage standards. The fact that these groups are all aiming to do the same thing raises a number of questions: Will the groups confuse the market and lengthen the march toward standardization? Will there be multiple standards? Is the FibreAlliance too much of an EMC-centric effort?

The EMC-led alliance came under criticism from those who prefer a more open approach to standards. The FibreAlliance is creating a Management Information Base (MIB) that will allow various third-party products to communicate with various EMC products.

"We think customers' interests are better served if there is a broad effort across the industry that focuses the efforts of the entire industry, rather than focusing on alliances that are driven by a particular vendor perspective or are only focused on a portion of the solution," says Kirby Wadsworth, vice president of marketing for the Storage Products Division of Compaq.

But the EMC group had a few criticisms of its own, with members accusing the SNIA of not working fast enough.

"Everyone is getting together and saying, 'Here is our vision, stay tuned.' The difference with the FibreAlliance is that EMC has joined 11 other companies with one common goal in mind: to significantly accelerate the adoption of fiber-based SANs into the marketplace," says Don Swatik, EMC vice president of product management. EMC is also a member of the SNIA. In fact, more than half of the members of the FibreAlliance are also members of the SNIA.

An exclusive club?

Notably absent from EMC's FibreAlliance are server vendors, such as Compaq, Intel, Data General and IBM, and infrastructure and storage vendors, such as Brocade Communications, Quantum and StorageTek. EMC, speaking for the FibreAlliance, says it will accept all comers as members. "The door is wide open for anybody who can make a contribution. This is not a closed club," Swatik says.

But so far, most of these vendors have not been invited, and several vendors, first informed of the association by *Network World,* expressed concern about the vendor-specific status of EMC's MIB. At present, the FibreAlliance specification works only with EMC storage devices.

Data General has interoperability relationships with an array of storage vendors, similar to what EMC is hoping to achieve with its new alliance. "How do you turn that into a standard?" asks Joel Reich, director of product management for Fibre Channel solutions at Data General's Clariion division. ◪

SAN management specifications

The following are issues and technologies addressed by the two competing standards.

FibreAlliance specification

Phase 1: Device discovery, status, device monitoring.

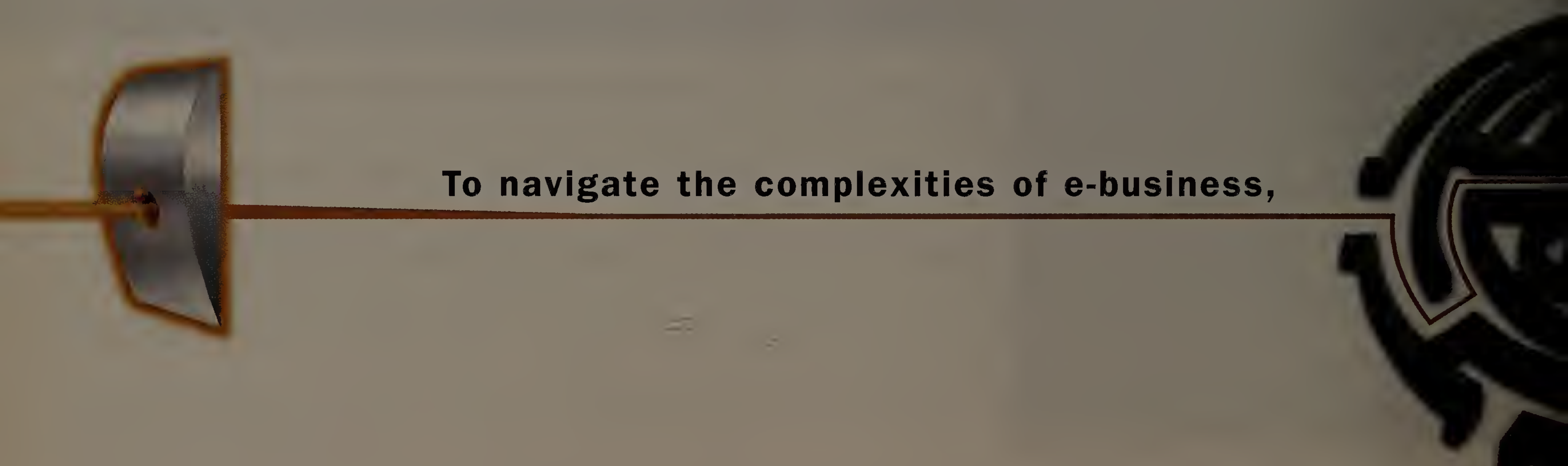
Phase 2: Device detection and automatic discovery, health of network, port detail and zoning.

Storage Network Industry Association specification

Phase 1: The fabric – hubs and switches.

Phase 2: Host server issues – host bus adapters.

Phase 3: Disk arrays, removable storage.



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Banks break new 'Net security ground

BY ELLEN MESSMER

HERNDON, VA. — A group of four U.S. banks has found that digital certificates from different vendors can be compatible — with a bit of tweaking.

In a pilot project that ended in November, Bank of America, Citibank, Mellon Bank and Zions Bank proved they could cooperate on processing debit payments via the Internet, but only by pounding on their technology partners — the digital certificate vendors — to resolve interoperability problems.

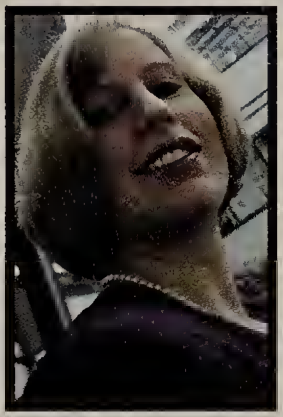
Going a step further, the banks, along with some security hotshots, plan to meet behind closed doors later this month to map an Internet payment-processing pilot plan. By mid-year, the payment-processing system will be tested in the real world by online merchants, consumers and corporate treasury divisions.

The goal is to have banks process debit and credit authorizations over the Internet authorizations that today are handled by proprietary automated clearinghouse nets.

For Internet authorizations to be successful, an individual would "sign" an electronic payment form using a digital certificate issued by his bank, which would act as the certificate authority in this public-key infrastructure (PKI).

The new pilot might even include mutual funds, court filings and purchase orders — digitally signed documents on which the validity of the signature needs to be checked.

"This is going to be more of a production with real transactions," says Julie Foster, director of the Internet Council at the National Automated Clearinghouse Association (NACHA), a group of 13,000 financial institutions — including the four pilot banks — that defines the industry's payment-processing rules.



NACHA's Foster is getting ready for a new electronic banking pilot featuring real transactions.

STAN BAROUH

Digital certificates link a person's identity to an encryption keypair so he can use the certificate to sign a document electronically. In the upcoming NACHA pilot, each bank would issue the certificates to a select number of consumers and merchant customers.

With each digitally signed payment document, there must be a remote online check of a certificate revocation list (CRL) to ensure the certificate is valid.

The four banks from last year's pilot project have set up Lightweight Directory Access Protocol (LDAP) servers on the Internet containing CRL information about the certificates they issued.

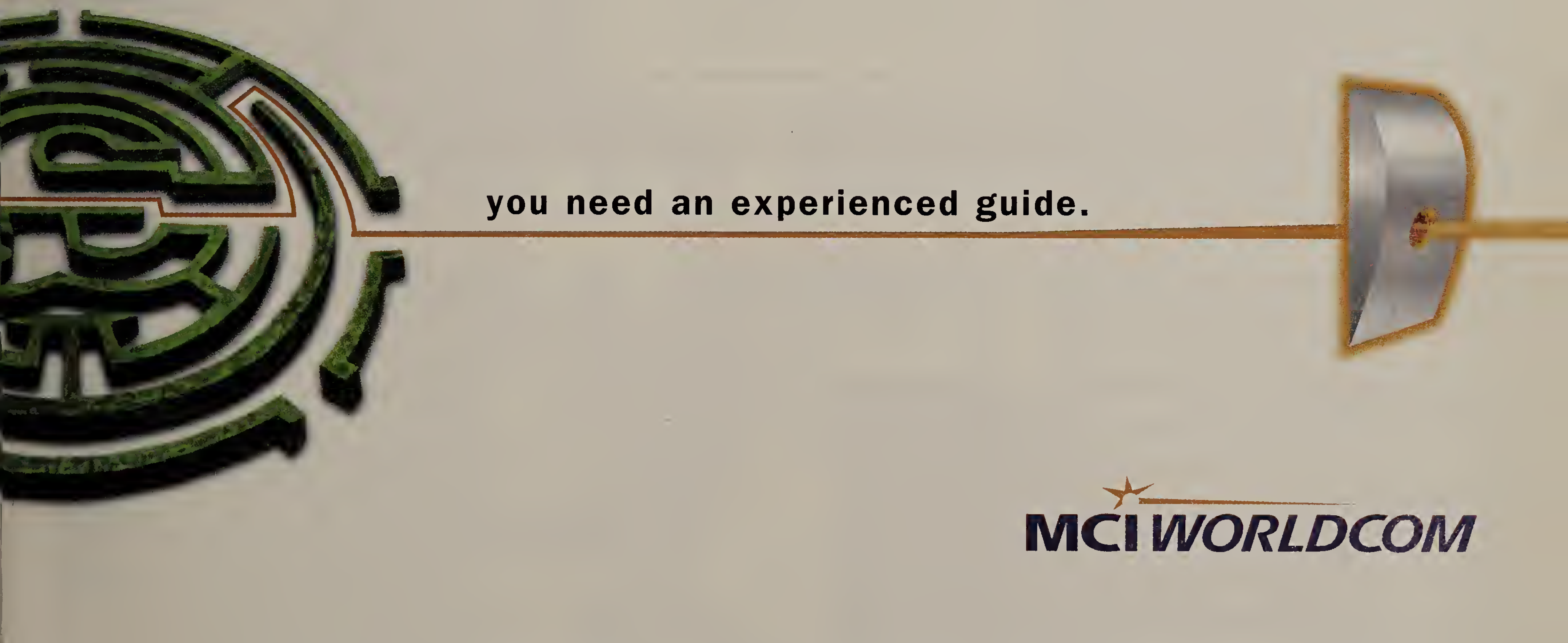
One stumbling block to the plan, though, has been interoperability problems in different vendors' PKI gear. A certificate from GTE CyberTrust, for example, couldn't be validated reliably by Entrust, VeriSign or IBM PKI equipment.

But with a determination to push the quarrelsome PKI vendors into interoperability, NACHA's five-month technical pilot last year forced Entrust, GTE Cybertrust, VeriSign and CertCo to prove they can play in the sandbox together.

NACHA paired each of these PKI vendors with a bank.

At the end of the pilot, the four banks discovered they could validate certificates issued by one another using different vendors' gear. Interoperability was possible because the PKI vendors agreed on a profile, a subset of the X.509 digital certificate standard and LDAP CRL lookups.

NACHA expects to release the technical report on last year's pilot next month. ◪



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Optical routing to set bandwidth free

BY TIM GREENE

A group of start-ups soon will deliver a new class of routers aimed at building more reliable public networks that could ultimately provide customers with less costly bandwidth.

The new gear — from Monterey Networks, New Access and others — adds intelligence to dense wavelength division multiplexing (DWDM) technology, which is typically found at the core of carrier networks. The idea is to tweak DWDM nets by adding optical routers. The new boxes take in optical traffic from DWDM multiplexers and switch the individual wavelengths.

The drawback to DWDM is that it only functions point to point. So if a point fails, all calls on the path are lost until an alternative path can be set up and individual sessions are reestablished.

With optical routers, DWDM traffic is switched wavelength by wavelength as it comes into optical hub sites, allowing carriers to establish meshed optical nets. The result is a more reliable net with virtually no downtime because the routers share network data and are smart enough to quickly route around failures, says Michael Guess, vice president of engineering for telecom carrier IXC Communications. It also means potentially lower prices because the bandwidth is managed more efficiently, Guess says.

Monterey Networks is working on what it calls an optical wavelength router that will switch DWDM light streams from one fiber to another (see graphic).

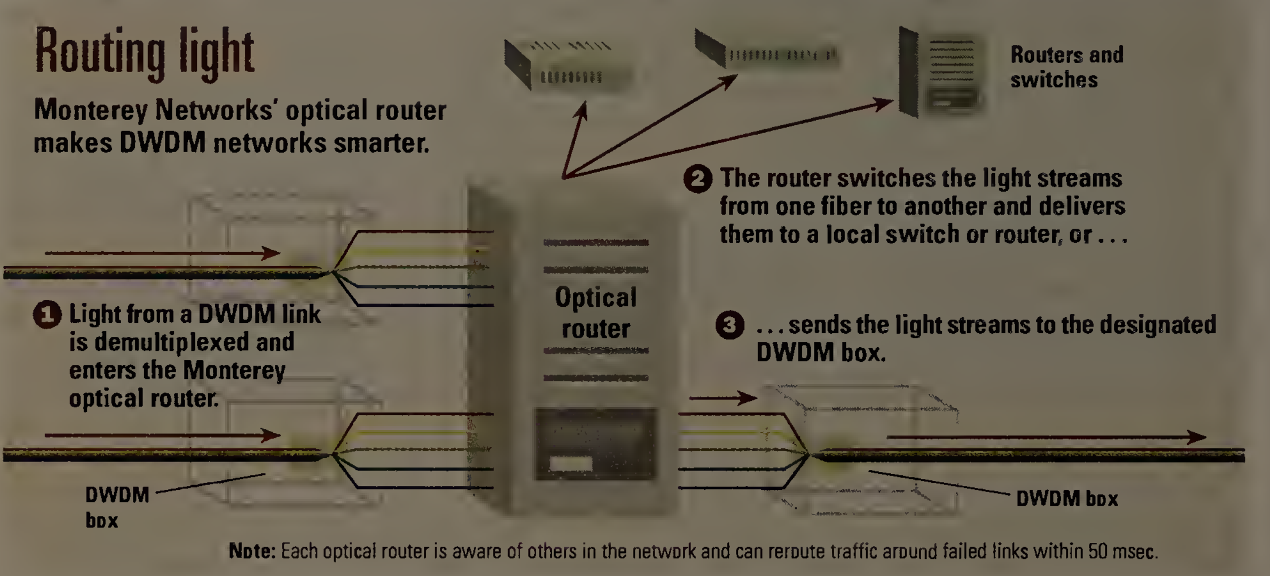
For example, a DWDM lightwave traveling from San Francisco to Chicago needs to be switched to New York. A Monterey wavelength router in Chicago takes a beam from San Francisco in one port, converts it to an electrical signal within the router, and reconverts it to an optical signal of the appropriate color. The router then puts the signal out on another port to New York. The box never parses the packets carried by the light.

Meanwhile, all the Monterey boxes in a network talk to each other, sharing status, bandwidth availability and other data.

While Monterey is dealing with efficiencies in the core of carrier networks, New Access is dealing with making local fiber access rings more efficient. ◪

Routing light

Monterey Networks' optical router makes DWDM networks smarter.


Routers and switches
❷ The router switches the light streams from one fiber to another and delivers them to a local switch or router, or . . .
❶ Light from a DWDM link is demultiplexed and enters the Monterey optical router.
Optical router
❸ . . . sends the light streams to the designated DWDM box.
DWDM box
DWDM box

Note: Each optical router is aware of others in the network and can reroute traffic around failed links within 50 msec.

New phone switches bringing circuit and packet nets together

Convergence devices to let data networks tap into proven phone network applications.

BY TIM GREENE

A new breed of voice switches has been designed to promote phone services only dreamed of in the past.

Switches from vendors such as Castle Networks, Salix Technologies and Sonus Networks will merge conventional public circuit-switched networks with developing public IP-based networks so customers on both types of nets can talk to each other.

This convergence lets the data network tap into the circuit-switched network's call features software, which supports services such as caller ID and national 800 numbers. The new switches tap into the software via a "service provisioning interface" that effectively lets data-switched nets support the services of a traditional phone network.

The interface can also be used to more quickly build and link new service applications written specifically for mixed voice/data networks. By contrast, today's traditional voice network service control software is complex and proprietary. The new switch interface strips away much of that complexity by supporting off-the-shelf servers as well as operating systems.

Applications developers familiar with standard data gear will jump in to create a flood of software for new services, predicts James Crowe, president and CEO of carrier Level 3 Communications.

The basic function of the new switches is to connect the public switched telephone network (PSTN) with packet-based networks. To do that, the new switches have to be able to talk to circuit and packet switches. That way, the switches can complete calls that start on the PSTN but are destined for a person on a packet-switched network and vice versa, according to Dan Simpkins, president and CEO of Salix.

Initially the switches will be attractive to new carriers that are building IP nets from scratch. But established local carriers will also use them because the switches enable gradual migration away from their current networks to the less-expensive packet networks that can carry voice and data.

Major local carriers, such as Bell Atlantic, are building long-distance networks based on packet technology. But local carriers will continue to use their local circuit-switched nets to feed voice onto the new backbone for a long time.

"Even if they were to start to aggressively transition today, it would still take 10 to 20 years for circuit switching to decline as the primary voice transport," Simpkins says.

In fact, Bell Atlantic says it could not afford to swap its circuit switches for packet switches even if it wanted to. Besides, IP carriers don't yet deliver a service that compares to circuit-switched voice.

"Until [IP service providers] upgrade their networks to get high voice quality, there is no need for us to switch. Economically, it doesn't make sense," says Joseph Farina, president and CEO of Bell Atlantic's Data Solutions Group. ◪

Good investment

Local phone companies have invested $323 billion in their networks. Those nets support 174 million access lines and generate $113 billion per year in revenue.

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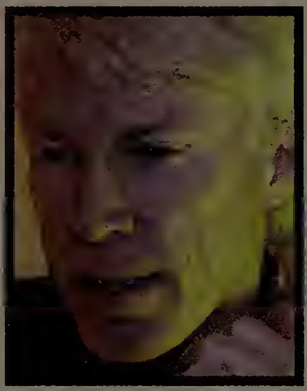
THE MICROSOFT DIARIES

THE MICROSOFT-DOJ TRIAL: WEEK FOURTEEN

MONDAY, FEB. 1

The self-proclaimed "Windows man" took the stand today. Microsoft Senior Vice President Jim Allchin brought a videotape that showed the benefits of Internet Explorer's integration with Windows 98, and the flaws that occur when you separate them. But Department of Justice lawyer David Boies used excerpts of the tape to press Allchin on whether Microsoft needed to tie the two technologies together. With a total of 19 questions, Boies asked whether the stand-alone version of Internet Explorer running on Windows 95 benefitted users in a similar way to the integrated Windows 98 version. In nearly every case, Allchin answered, "Yes."



KATHLEEN KING

Jim "Windows man" Allchin is caught on tape.

TUESDAY, FEB. 2

Seeing is believing, right? Well, maybe not. Microsoft spent most of today fending off accusations that it doctored the videotape Allchin showed yesterday to demonstrate there was a performance degradation for certain Windows 98 functions when the browser files were removed. A closer look at the title bar showed that Explorer was in fact still installed on the machine in question. When confronted with the discrepancy, Allchin sat on the stand stunned like a deer caught in headlights.

WEDNESDAY, FEB. 3

Microsoft suffered videotape Bombshell II: The Sequel, in its antitrust trial today. The government was able to show that Microsoft used multiple PCs to film the videotape; Microsoft implied that the tape was filmed using only one PC.

Boies pointed to a number of places in the 4-minute segment that showed possible inconsistencies. But the knockout punch was a missing icon for Microsoft Outlook, a scheduler and e-mail program, that appeared on one Windows screen in the video but wasn't evident in another segment.

The courtroom revelation left Allchin, Microsoft's chief technical witness, stammering for an explanation and drew harsh words from Judge Thomas Penfield Jackson, who held his head in his hands at one point.

Penfield mercifully gave Microsoft a chance to film the segment over — this time on a single PC — in the presence of a government lawyer. It will be aired in court tomorrow.

THURSDAY, FEB. 4

This time Allchin did the test himself. Microsoft aired the videotape of Allchin demonstrating how two Microsoft applications — Money 99 and Microsoft Plus Deluxe CD — malfunctioned after the Internet Explorer files were removed from Windows 98. In addition, a Windows Update Web site was disabled and the computer was thrown into a frozen mode during the demonstration.

However, Allchin was unable to recreate a key portion of the test that showed the actual performance of the operating system was affected by removing the browser from the bundle. That portion of the test was the one that drew government scrutiny of the original videotape.

— *Christine Burns*

Start-up touts TV-quality low-bandwidth video

SightPath premieres appliances for 'private Internet video network.'

BY PAUL MCNAMARA

WALTHAM, MASS. — Start-up SightPath, Inc. is touting Internet appliances it claims will deliver TV-quality video to PCs on demand, without slowing key network services.

Headed by David Gifford, founder of e-commerce start-up Open Market and a professor at the Massachusetts Institute of Technology, SightPath this week will announce SightPath Appliance and SightPath Studio.

SightPath Appliance is a server-like hardware/software device that sits on a LAN and locally stores multimedia content. It can be simultaneously accessed over existing LAN connections by up to 20 viewers via any standard Web browser, according to the Waltham, Mass., company.

SightPath Studio is a hardware/software device used to manage a company's library of video content from a central location. It then routes pieces of video content to designated SightPath Appliances during times of light bandwidth use.

> ■ **"This will allow us to provide high-quality information and a wide array of information to our reseller channel."**
>
> Jeff Edson, general manager, Intergraph

When an end user clicks on a SightPath-enabled Web link to request content, the request is automatically directed to the nearest SightPath Appliance, which then will deliver the video.

According to beta testers and industry analysts, the SightPath formula for "private Internet video networks" has the potential to overcome bandwidth and cost obstacles that have plagued other multimedia technologies.

PROFILE: SightPath, Inc.

Headquarters:	Waltham, Mass.
Founded:	1998 (Originally as Clearview Technologies)
Business:	SightPath multimedia Internet appliance, which promises TV-quality, on-demand video within existing bandwidth.
Founders:	MIT professor David Gifford; Jim Ricotta, president and CEO; MIT professor Frans Kaashoek, chief scientist; and Jim O'Toole, chief technology officer.
Finances:	$3.5 million in venture funding received April 1998.

Jeff Edson, general manager of Intergraph Computer Systems in Huntsville, Ala., says his company is "excited" to give the SightPath products a workout.

"This will allow us to provide high-quality information and a wide array of information to our reseller channel, as well as internally to Intergraph," Edson says. "This replaces having to be face-to-face all the time."

While SightPath's strategy has not been proven, Edson is confident the company can deliver on its network resource claims. "Clearly this will require bandwidth during downloads," Edson says. "But the beauty is this can happen at any time of the day or night, unlike most other options for dispersing information like this."

David Dines, an analyst at Boston-based Aberdeen Group, foresees increasing demand for online video that can be accessed at will. "Conceptually, SightPath's approach makes sense, but how the product actually works in the real world remains to be seen," Dines says.

Although prices have not been finalized, SightPath Studio is expected to cost between $50,000 and $100,000, and each SightPath Appliance will be priced from $3,000 to $5,000, says President and CEO Jim Ricotta.

The SightPath products are expected to be available in late March.

In the meantime, another start-up, VBrick Systems, Inc. of Wallingford, Conn., has begun shipping its own line of network devices, called VBricks. These devices, which start at $3,000, also promise high-quality video and low bandwidth consumption.

SightPath: (781) 663-8200

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Whom did C. Michael Armstrong replace as CEO at AT&T?

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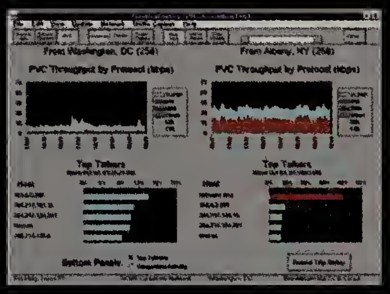
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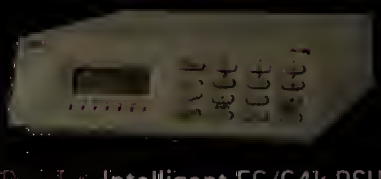

- DSU IQ Intelligent 56/64k DSU/CSU
- [illegible] Intelligent T1 DSU/CSU
- [illegible] Intelligent T1 DSU/CSU with TDM voice
- IQ Probe Intelligent monitoring device for international circuits

- 1xIQ [illegible] Intelligent expansion card for T1 DSU/CSUs

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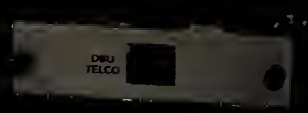

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1. What is the principal business activity at your location?

(check ONE only)

01. ☐ Manufacturing (other)
02. ☐ Finance/Banking
03. ☐ Insurance/Real Estate/Legal
04. ☐ Health Care Services
05. ☐ Hospitality/Entertainment/Recreation
06. ☐ Media/TV/Cable /Radio/Print
07. ☐ Retail/Wholesale Trade/Business Services
08. ☐ Transportation
09. ☐ Utilities
10. ☐ Education
11. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
12. ☐ Government (Federal/State/Local)
13. ☐ Military
14. ☐ Aerospace
15. ☐ Consulting (Independent)*
16. ☐ Carriers/Interconnects
17. ☐ Internet Service Provider (ISP)
18. ☐ Manufacturing (Computer/Communications/OEM)
19. ☐ Resellers of Computer/Network Products (VARs, VADs)
20. ☐ Systems/Network Integrators*
21. ☐ Distributors (Computer/Communications)*
22. ☐ Other (please specify) ____________

* *Please complete form based on largest client.*

2. What is your job function?

(check ONE only)

NETWORK IS MANAGEMENT:

1. ☐ Network Management
2. ☐ LAN Management
3. ☐ Datacom/Telecom Management
4. ☐ IS/IT/MIS/CIO/Systems Management
5. ☐ Internet/Intranet/Electronic Commerce Mgmt., Webmaster
6. ☐ Engineering Management
7. ☐ Corporate Management (CEO, Pres., VP, Dir., Mgr., Financial Management)
8. ☐ Consultant (Independent)
9. ☐ Other ____________

3. What is the estimated value of Network equipment and services that you specify, recommend or approve the purchase of?

(Please print the appropriate number code on the line next to each product category. Please complete ALL categories A–N.)

1. $100 Million or more
2. $50 Million to $99.9 Million
3. $25 Million to $49.9 Million
4. $10 to $24.9 Million
5. $1 to $9.9 Million
6. $100,000 to $999,999
7. $50,000 to $99,999
8. Under $50,000
9. None of the above

A ______ Large Systems (Mainframes/Minis)
B ______ Desktops (Micros/Laptops/Workstations)
C ______ Servers
D ______ LANs
E ______ WAN Equipment
F ______ Carrier Services
G ______ Internetworking
H ______ Internet
I ______ Intranet
J ______ Extranet
K ______ Remote Access
L ______ Peripherals
M ______ Software
N ______ Service/Support

4. What is the total number of sites for which you have purchase influence?

(check ONE only)

1. ☐ 100+ 2. ☐ 50 – 99 3. ☐ 20 – 49 4. ☐ 10 – 19 5. ☐ 2 – 9 6. ☐ 1 7. ☐ None

5. What is the total number of Servers/Clients/LANs installed/planned at your location/in your entire organization?

(check ONE box in each column)

SERVERS At Location A		SERVERS Entire Org. B	CLIENTS At Location C		CLIENTS Entire Org. D	LANS At Location E		LANS Entire Org. F
☐	1. 50,000+	☐	☐	1. 50,000+	☐	☐	1. 50,000+	☐
☐	2. 10,000 to 49,999	☐	☐	2. 10,000 to 49,999	☐	☐	2. 10,000 to 49,999	☐
☐	3. 1,000 to 9,999	☐	☐	3. 1,000 to 9,999	☐	☐	3. 1,000 to 9,999	☐
☐	4. 100 to 999	☐	☐	4. 100 to 999	☐	☐	4. 100 to 999	☐
☐	5. 50 to 99	☐	☐	5. 50 to 99	☐	☐	5. 50 to 99	☐
☐	6. 10 to 49	☐	☐	6. 10 to 49	☐	☐	6. 10 to 49	☐
☐	7. 1 to 9	☐	☐	7. 1 to 9	☐	☐	7. 1 to 9	☐
☐	8. none	☐	☐	8. none	☐	☐	8. none	☐

6. What is your scope and involvement in purchasing decisions for network products and services for your enterprise?

A. Scope (check one only)

1. ☐ Corporate/Enterprise
2. ☐ Department
3. ☐ None

B. Involvement (check ALL that apply)

1. ☐ Create Network Strategy
2. ☐ Recommend/Specify
3. ☐ Approve
4. ☐ Evaluate
5. ☐ Determine the Need
6. ☐ None

7. What is the estimated number of employees at your location/in entire organization?

(check ONE in each section)

A. At your location:

1. ☐ Over 20,000
2. ☐ 10,000 – 19,999
3. ☐ 5,000 – 9,999
4. ☐ 2,500 – 4,999
5. ☐ 1,000 – 2,499
6. ☐ 500 – 999
7. ☐ 250 – 499
8. ☐ 249 or less

B. Entire organization:

1. ☐ Over 20,000
2. ☐ 10,000 – 19,999
3. ☐ 5,000 – 9,999
4. ☐ 2,500 – 4,999
5. ☐ 1,000 – 2,499
6. ☐ 500 – 999
7. ☐ 499 or less

8. Please indicate the products/services that you are currently involved in purchasing or plan to purchase:

(check ALL that apply)

A. Currently involved in purchasing B. Plan to purchase

INTERNET/INTRANET

A B
☐ 01. ☐ Internet Services/Web Hosting
☐ 02. ☐ Firewalls/Security/Encryption
☐ 03. ☐ Web Servers/Software
☐ 04. ☐ Web Servers/Hardware
☐ 05. ☐ TCP/IP Software
☐ 06. ☐ Management/Monitoring Software
☐ 07. ☐ Voice/Video Over IP
☐ 08. ☐ VPN Equipment/Services
☐ 09. ☐ Legacy Integration Tools (Web to Host)
☐ 10. ☐ Web Development Tools (JAVA, ActiveX, etc.)
☐ 11. ☐ Push Technology
☐ 12. ☐ Web Browsers
☐ 13. ☐ Intranet Applications/Groupware
☐ 14. ☐ Search/Retrieval Products (web crawler)
☐ 15. ☐ Electronic Commerce Tools
☐ 16. ☐ Web Authoring Tools
☐ 17. ☐ Other ____________

LOCAL-AREA NETWORKS/ INTERNETWORKING

A B
☐ 18. ☐ Local-Area Networks
☐ 19. ☐ Network Operating System Software
☐ 20. ☐ Servers
☐ 21. ☐ Print Servers
☐ 22. ☐ Routers
☐ 23. ☐ ATM Switches
☐ 24. ☐ Token-Ring Switches
☐ 25. ☐ Ethernet Switches
☐ 26. ☐ Fast Ethernet
☐ 27. ☐ Gigabit Ethernet
☐ 28. ☐ Layer 3 Switches
☐ 29. ☐ Network Storage Devices (NASs, SANs)
☐ 30. ☐ LAN Storage/Backup
☐ 31. ☐ Optical Storage/Backup/Jukeboxes
☐ 32. ☐ Disk Storage/Backup
☐ 33. ☐ Tape Storage/Backup
☐ 34. ☐ RAID Storage/Backup
☐ 35. ☐ Network Test/Diagnostic Tools
☐ 36. ☐ Cables, Connectors, Baluns
☐ 37. ☐ UPS
☐ 38. ☐ Network Interface Cards (NICs)
☐ 39. ☐ Hubs
☐ 40. ☐ Intelligent Hubs
☐ 41. ☐ Stackable Hubs
☐ 42. ☐ Bridge/Router
☐ 43. ☐ SNMP Network Management
☐ 44. ☐ Gateways
☐ 45. ☐ Concentrators/Repeaters
☐ 46. ☐ Other (please specify) ____________

COMPUTERS/PERIPHERALS

A B
☐ 47. ☐ Thin Clients/Network Computers (NCs)
☐ 48. ☐ Laptops/Notebooks/Sub-Notebooks
☐ 49. ☐ Micros/PCs
☐ 50. ☐ Minis
☐ 51. ☐ Mainframes
☐ 52. ☐ Workstations
☐ 53. ☐ Printers/Network Printers
☐ 54. ☐ CD-ROM/DVD
☐ 55. ☐ Fax/Modem Boards
☐ 56. ☐ Memory/Chips/Boards/Cards
☐ 57. ☐ Other ____________

REMOTE/WIRELESS COMPUTING

A B
☐ 58. ☐ Remote Access Products
☐ 59. ☐ Remote Access Services
☐ 60. ☐ PDAs
☐ 61. ☐ PCMCIA Devices
☐ 62. ☐ Wireless Data Equipment/Services
☐ 63. ☐ Cellular Equipment & Services
☐ 64. ☐ Other (please specify) ____________

SOFTWARE/APPLICATIONS

A B
☐ 65. ☐ Network Management
☐ 66. ☐ Systems Management
☐ 67. ☐ Security
☐ 68. ☐ Communications Software
☐ 69. ☐ Terminal Emulation
☐ 70. ☐ Operating Systems
☐ 71. ☐ Applications Development Tools
☐ 72. ☐ Database Management/ RDBMS
☐ 73. ☐ Groupware
☐ 74. ☐ Workflow
☐ 75. ☐ EDI
☐ 76. ☐ E-mail
☐ 77. ☐ Desktop Videoconferencing
☐ 78. ☐ Imaging
☐ 79. ☐ Suites/Server Suites (Back Office, etc.)
☐ 80. ☐ Middleware
☐ 81. ☐ Document Management
☐ 82. ☐ Site Metering Tools
☐ 83. ☐ Computer Telephony Integration (CTI)
☐ 84. ☐ Data Warehousing
☐ 85. ☐ Anti Virus Software
☐ 86. ☐ Multimedia
☐ 87. ☐ Yr. 2000 Conversion Software (Y2K)
☐ 88. ☐ Helpdesk
☐ 89. ☐ Web Based Management Tools
☐ 90. ☐ Directory Services
☐ 91. ☐ Other (please specify) ____________

WIDE-AREA NETWORK EQUIPMENT & SERVICES

A B
☐ 92. ☐ 56 Kbps Modems
☐ 93. ☐ Under 56 Kbps Modems
☐ 94. ☐ Cable Modems
☐ 95. ☐ Asynchronous Transfer Mode (ATM)
☐ 96. ☐ Frame Relay Equipment/Services
☐ 97. ☐ ISDN Equipment & Services
☐ 98. ☐ FT-1/T-1/T-3 Multiplexers/Services
☐ 99. ☐ xDSL Services/Products
☐ 100. ☐ Diagnostic/Test Equipment
☐ 101. ☐ DSU/CSU
☐ 102. ☐ PBXs
☐ 103. ☐ Videoconferencing
☐ 104. ☐ Leased Lines
☐ 105. ☐ Switched Data
☐ 106. ☐ Virtual Private Networks (VPN)
☐ 107. ☐ FRADs
☐ 108. ☐ Managed LAN/Router Services
☐ 109. ☐ Other ____________
☐ 110. ☐ Outsourcing/Systems Integration Services
☐ 111. ☐ Education/Training Services
☐ 112. ☐ None of the above (1–111)

9. Please indicate the platforms that are currently installed/planned:

(check ALL that apply)

A. Currently Installed B. Planned for purchase

NETWORK PROTOCOLS

A B
☐ 01. ☐ TCP/IP
☐ 02. ☐ IPv6
☐ 03. ☐ SNA
☐ 04. ☐ Novell IPX/SPX
☐ 05. ☐ APPC/APPN/LU 6.2
☐ 06. ☐ NETBIOS
☐ 07. ☐ NFS
☐ 08. ☐ SNMP
☐ 09. ☐ Other ____________

LAN ENVIRONMENT

A B
☐ 10. ☐ Gigabit Ethernet
☐ 11. ☐ Switched Ethernet
☐ 12. ☐ Fast Ethernet (100 Megabit Ethernet)
☐ 13. ☐ Ethernet
☐ 14. ☐ ATM
☐ 15. ☐ Token Ring/Token Ring Switching
☐ 16. ☐ IP Switching
☐ 17. ☐ Layer 3 Switching
☐ 18. ☐ FDDI
☐ 19. ☐ 100Base-T
☐ 20. ☐ 10Base-T
☐ 21. ☐ Fibre Channel
☐ 22. ☐ Other ____________

NETWORK OPERATING SYSTEM

A B
☐ 23. ☐ Windows NT
☐ 24. ☐ Windows NT/Advanced Server
☐ 25. ☐ Novell IntranetWare
☐ 26. ☐ Novell (NetWare 5.X)
☐ 27. ☐ Novell (NetWare 4.X)
☐ 28. ☐ Novell (NetWare 2.X, 3.X)
☐ 29. ☐ Microsoft (LAN Manager)
☐ 30. ☐ Banyan (VINES)
☐ 31. ☐ IBM (Server)
☐ 32. ☐ Other (please specify) ____________

COMPUTER OPERATING SYSTEM

A B
☐ 33. ☐ NT Server
☐ 34. ☐ NT Workstation
☐ 35. ☐ Unix/Xenix/AIX/SCO
☐ 36. ☐ Solaris
☐ 37. ☐ Windows
☐ 38. ☐ Windows 95
☐ 39. ☐ Windows 98, .9x
☐ 40. ☐ DOS
☐ 41. ☐ OS/2, OS/2 Warp
☐ 42. ☐ IBM MVS/VM/VSE
☐ 43. ☐ Digital VMS
☐ 44. ☐ Macintosh
☐ 45. ☐ Other ____________
☐ 46. ☐ None of the above (1–45)

10. Which of the following Servers/Clients do you have installed/planned at your location?

(check ALL that apply in each column)

	A. Servers		B. Clients		A. Servers		B. Clients
Power PC	☐	01.	☐	486, 386, 286	☐	07.	☐
Power Mac	☐	02.	☐	Sun Sparc	☐	08.	☐
Mac Other	☐	03.	☐	Risc	☐	09.	☐
Multiprocessor Servers	☐	04.	☐	Alpha	☐	10.	☐
Pentium II (PII)	☐	05.	☐	Other	☐	11.	☐
Pentium/Pentium Pro	☐	06.	☐				

11. Which of the following hardware platforms are installed/planned in your company?

(check ALL that apply)

A - Mainframes (Large Scale)

1. ☐ IBM
2. ☐ Amdahl
3. ☐ Cray
4. ☐ Hitachi
5. ☐ Unisys
6. ☐ Other ____________

B - Minis (Midrange)

1. ☐ IBM RS/6000
2. ☐ IBM AS/400
3. ☐ Digital
4. ☐ Tandem
5. ☐ Unisys
6. ☐ AT&T GIS
7. ☐ H-P
8. ☐ Data General
9. ☐ Other ____________

C - Workstations

1. ☐ Sun Microsystems
2. ☐ Silicon Graphics
3. ☐ Digital
4. ☐ H-P
5. ☐ IBM
6. ☐ Other ____________

12. What is the estimated gross revenue of your entire company/institution?

(check ONE only)

01. ☐ $20 billion or more
02. ☐ $10 billion to $19.9 billion
03. ☐ $1 billion to $9.9 billion
04. ☐ $500 million to $999.9 million
05. ☐ $100 million to $499.9 million
06. ☐ $50 million to $99.9 million
07. ☐ $10 million to $49.9 million
08. ☐ $5 million to $9.9 million
09. ☐ $4.9 million or less
10. ☐ None of the above

13. For which areas outside of North America do you have purchase influence?

(check ALL that apply)

1. ☐ Europe 2. ☐ Asia 3. ☐ South America 4. ☐ Australia 5. ☐ Middle East 6. ☐ None

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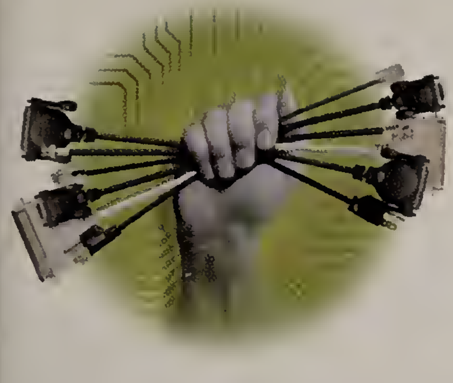


Infrastructure

TCP/IP, LAN/WAN Switches, Routers, Hubs, Access Devices, Clients, Servers, Operating Systems, VPNs

Briefs

Vixel last week rolled out an eight-port Fibre Channel device designed to help customers migrate from hub- to switch-based storage networks. The Vixel 8100 switch, which sits between servers and storage resources, boasts 200M byte/sec connectivity on each port and can be managed via Vixel's SAN InSite software.

The Vixel 8100, available in April, will cost $8,495.

Vixel: (425) 806-5509

IBM has announced two new models of its 2212 Access Utility device that cost up to $2,000 less than previous versions of this branch-office product. The 2212 line sports four WAN ports for handling virtual private networks, ISDN and integrated voice, fax and data traffic. The devices can be configured to support 10/100M bit/sec Ethernet or token-ring LANs. The two new models differ from one another only in that the 10F contains a flash memory and the 10H has a hard-drive memory. They each have one expansion slot, whereas previous versions included four. The devices will be available on Feb. 26, and prices will start at $4,400.

IBM: (800) 426-2255

Intel last week announced a 10/100M bit/sec Ethernet network interface card that can be software-tuned to give certain applications faster access to a server. The Pro/100+ Server Adapter also complies with the Wired for Management 2.0 specification, which allows network administrators to remotely configure systems and troubleshoot. The card can work with dissimilar Intel adapters to back up one another in case of a failure.

The card, available in March, will cost $119.

Intel: (800) 538-3373

IN-SITE: *Lessons from Leading Users*

How firm stays atop 25,000 updates per second

BY JEFF CARUSO

If you think your network puts you in a tough spot, consider Len Monteleone's position. Externally, his network is about to serve up-to date financial information over the World Wide Web. Internally, he has to deal with a network application called "the beast."

Monteleone is director of IT at Tullett & Tokyo Forex, an international securities trading company, which is upgrading its network to reach out to large customers over the Web. But because timing decides whether money is made or lost on a trade, the company's first priority is to make sure its own traders have real-time pricing data.

Securities prices are updated 25,000 times per second, and that's why the application that delivers the updates to the trading floor has earned the moniker of "the beast."

"Early on with the beast, we blew up every piece of equipment that we had," Monteleone says. Cisco routers and 3Com network interface cards were among the devices that couldn't keep up with the high volume.

Two years ago, Tullett & Tokyo installed Xylan switches to tame the beast. About a dozen Windows NT servers connect through four of Xylan's OmniSwitch LAN and ATM switches. The OmniSwitches in turn connect to Xylan PizzaSwitches at every trading desk via 155M bit/sec ATM. The PizzaSwitches provide 10M bit/sec and 100M bit/sec Ethernet

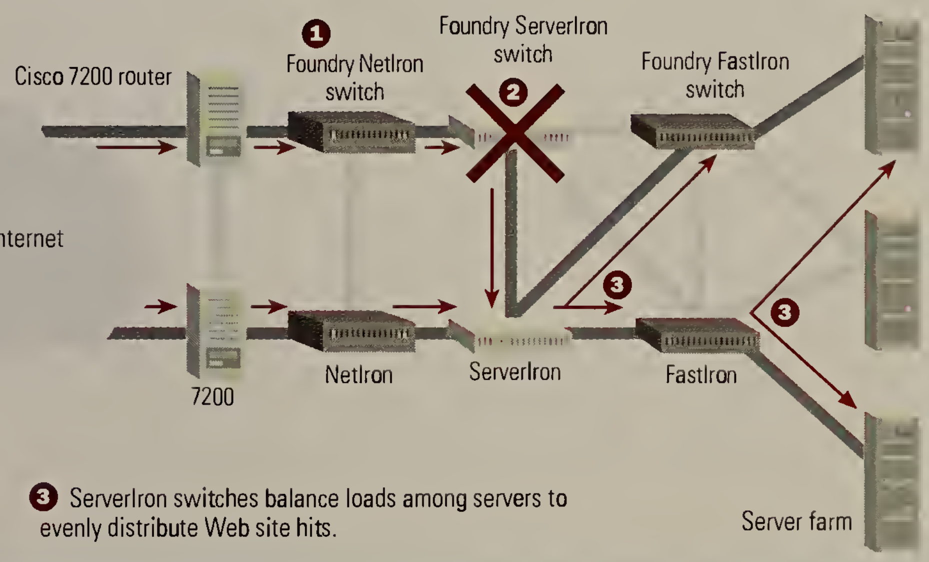
See **IN-SITE**, page 22

Bring on the world

Tullett & Tokyo Forex is installing Foundry Networks switches to direct Internet traffic to its Web servers.

❶ Foundry NetIron switches route traffic at high speeds from Cisco routers connected to the Internet.

❷ All Foundry switches on Tullett & Tokyo's network are redundant and can failover to another if necessary.



❸ ServerIron switches balance loads among servers to evenly distribute Web site hits.

New Cabletron stackable switch scales to gigabit speeds

Aggressively priced device packed with advanced features, including quality-of-service support.

BY JIM DUFFY

ROCHESTER, N.H. — A Cabletron stackable switch introduced last week is designed to allow users to connect high-performance desktops to Gigabit Ethernet backbones at attractive prices.

The SmartStack ELS100-24TXG is a 24-port 10/100M bit/sec autosensing Ethernet switch with two Gigabit Ethernet uplinks. The device is targeted at large sites requiring lots of ports at the edge of an enterprise network, and at shared-hub customers looking to migrate to switching.

The new SmartStack features a 4.2G bit/sec switching fabric, a forwarding rate of 6M packet/sec and a per-port list price of $166 to $180. Conversely, 10/100/1000M bit/sec switches from 3Com and Nortel Networks have switching fabrics up to 2.5G bit/sec, forwarding rates as fast as 10M packet/sec and per-port prices between $153 and $243.

Though Cabletron claims to have one of the highest performing stackable switches on the market at the lowest price, analysts say price is becoming less of a determinant for user purchases.

"There's not a whole lot of difference between the top four vendors in terms of pricing," says Esmeralda Silva of International Data Corp. in Framingham, Mass. Customers are becoming more con-

See **Cabletron**, page 22

Expandable Fast Ethernet switch

Cabletron is offering a new Fast Ethernet switch that supports a variety of Gigabit Ethernet uplinks.

Product	Description	List Price
ELS100-24TXG	24-port 10/100M bit/sec switch with two Gigabit Ethernet sockets	$3,995
GPIM-01	1000Base-SX fiber interface	$695
GPIM-04	Shielded twisted pair interface	$895
GPIM-09	1000Base-LX fiber interface	$1,695

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Kentrox puts new spin on DSUs/CSUs

BY TIM GREENE

PORTLAND, ORE. — DSUs/CSUs are getting so smart they deserve a new name.

That's the view of ADC Kentrox, which pronounced DSUs/CSUs dead and introduced a new product called the ServicePoint service delivery unit (SDU) to replace them.

ServicePoint performs the functions of a traditional dumb DSU/CSU — it terminates WAN circuits and establishes interfaces to LAN gear at customer sites — but the product also monitors the use of WAN circuits to see what traffic types and which users are eating up bandwidth. Additionally, ServicePoint software monitors the performance of frame relay circuits to ensure they meet the delay, throughput and availability guarantees written into frame relay carriers' service-level agreements.

By mid-1999, Kentrox will introduce control software for ServicePoint gear that will enforce usage policies. For example, applications could be limited to using a certain amount of bandwidth. The control software will also set which applications get priority during congested periods.

Kentrox also plans to add software support for ATM and IP traffic.

Because network managers will have more information about traffic going over the WAN link, they will be better able to decide how big those links should be. That will let net managers optimize performance on the link without wasting money by purchasing too much bandwidth, Kentrox representatives say.

If used in its simplest form as just a circuit termination point, ServicePoint SDU is four to six times more expensive than simple DSUs/CSUs, which cost $300 to $500. But customers may be willing to pay the price if they expect their WAN needs to change, says Christopher Nicoll, a senior research analyst at Current Analysis in Sterling, Va.

"It's more expensive because of the added flexibility. What you're banking on is that you're not going to leave it out there for basic line termination," Nicoll says.

ServicePoint will compete with Visual Networks' Visual Up-Time frame relay network probes and software on the basis of its monitoring capabilities, Nicoll says. But ServicePoint also enables customers to shape traffic as it enters the WAN, he says.

ServicePoint will fit well in a network that already has a large router the customer doesn't want to tamper with, according to to Todd Inch, manager of communications for the IT division of network implementer Cotelligent in San Francisco.

But other customers might be better off buying a $3,000 router with DSU/CSU and policy management features built in, Inch says. The net manager says he would consider using ServicePoint in the future because of the product's flexibility.

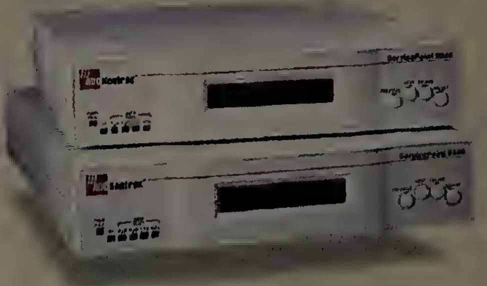
ServicePoint is available in two hardware configurations. ServicePoint 2040 has a T-1 WAN port as well as a V.35 port. ServicePoint 2140 has the same configuration plus a T-1 add/drop port to connect to a PBX. ServicePoint 2040 costs $1,695 as a termination unit and $2,495 with monitoring software included. ServicePoint 2140 costs $2,195 as a termination unit and $2,995 with monitoring software included. Both are available now.

The units with control software have not been priced. All of the software packages can be downloaded in-band to the ServicePoint units after they are installed in customers' nets.

Kentrox: (800) 733-5511

Kentrox ousts DSUs/CSUs

ADC Kentrox introduces its ServicePoint line, stand-alone boxes that do more than DSUs/CSUs.



- Set and enforce rules on bandwidth allotted to users and applications.
- Prioritize users and applications during congested periods.
- Monitor traffic by user and application.
- Download software to expand functions.

Much ado about cabling

BY JEFF CARUSO

WASHINGTON, D.C. — Cabling issues were surprisingly big at the recent ComNet/DC '99 trade show, with several vendors announcing new media converters for connecting copper wires to fiber-optic lines and other media.

Allied Telesyn International previewed converters it will announce this week that hook multimode fiber to single-mode using 10M bit/sec or 100M bit/sec Ethernet. This allows companies to stretch fiber-optic connections from 5 to 15 km. The 10M bit/sec version costs $960, and the 100M bit/sec version is priced at $1,450.

Transition Networks in Minneapolis announced media converters for IBM 3270 and 5250 terminals, allowing these copper-connected terminals to send data over fiber-optic lines. The converters range in price from $395 to $695.

Companies are using media converters to squeeze more performance out of existing network equipment, says Mark Benevento, product marketing manager at Allied Telesyn in Sunnyvale, Calif. The media converters can extend the distances companies send data without forcing them to upgrade core net equipment.

The market for conversion technology is expected to grow from $132 million last year to about $184 million this year, according to a recent report from market research firm Frost & Sullivan.

Marketing wars continued at the show between 3M and the MT-RJ Consortium, as each pushed its own version of new fiber-optic connectors. In both cases, the connectors take up half the space of previous fiber-optic connectors and are patterned after the commonly used copper-based RJ-45 jacks. The MT-RJ Consortium even hosted a well-attended session to describe its technology. ◪

Data General debuts Fibre Channel storage device

BY DENI CONNOR

WESTBOROUGH, MASS. — Data General last week topped off its storage line with a new Fibre Channel disk array designed to handle I/O-intensive applications.

The company's Clariion FC5700 is a fully redundant 10-slot chassis that connects to servers over a Fibre Channel loop and can contain up to 120 9G- to 18G-byte drives. The array features two active storage processors that can take over for one another in case one fails. The chassis is equipped with two power supplies, two link control cards and redundant fans. Data can be balanced across drives within an array.

Data General's offering is available in a pedestal or rack-mount configuration and supports the company's newest 10,000 rpm Fibre Channel drives. It also works in conjunction with Data General's FC54/5500 disk array. The new disk array subsystem supports RAID levels 0, 1 and 5, as well as hot-spare technology and online drive rebuilding.

The product operates in networks running Windows NT, Solaris, HP-UX and AIX. Customers can manage the array via Data General's Navisphere Windows NT management software. Pricing for the FC5700 disk array starts at $50,000.

Data General's new disk arrays boast redundant components across the board.

Data General also introduced a four-processor Pentium II Xeon server for customers who have limited space in which to house their computers. Up to nine of the new AV3704R machines can be stacked in a chassis.

The server can be used to run Data General's Cluster-in-a-Box, which includes Microsoft Cluster Server, and Data General's TermServer-in-a-Box, which includes Windows Terminal Server.

The new box is available with up to 2M bytes of Level 2 cache per processor and up to 4G bytes of main memory. It supports six PCI slots and one shared PCI/ISA I/O slot. The server includes six internal hot-swap drive bays, redundant cooling and optional hot-swap redundant power.

The AV3704R comes with a 10/100M bit/sec PCI Ethernet adapter and works with Data General's Clariion Fibre Channel disk array subsystems. Customers can manage the server via Data General's NTerprise Manager software.

A version of the server with 512K bytes of Level 2 cache, 128M bytes of RAM and a 9G-byte drive costs about $13,000.

Data General: (508) 898-5000

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IN-SITE,
continued from page 17

connections to the desktops.

Monteleone says one of the biggest advantages of this approach is that there is no wiring closet on the trading floor. The company didn't have to buy a large box for the closet and doesn't have cables running out to every desktop. Instead, there are only 23 fiber-optic strands running to the PizzaSwitches at the trading desks. Short cables connect each PizzaSwitch to the 10 or 12 workstations at each desk.

The whole shebang cost about $250,000, whereas other vendors' solutions would have been two or three times that amount, Monteleone says. Much of the savings came from not having to recable the trading floor.

The switches have kept pace with the beast, delivering all updates to traders in real time. "You can't believe the amount of information you're looking at," Monteleone says.

A peek inside

The new challenge is presenting market data to the outside world. Monteleone recently spent about $50,000 for six Foundry Networks Fast Ethernet switches, as part of the company's initiative to make select information available on the Web. This information includes end-of-day pricing and historical data related to different securities markets and foreign exchanges.

The Foundry switches provide redundant connections so if a switch fails, Web traffic will still be able to get through to the servers (see graphic, page 17). There ought to be more than enough bandwidth to handle the load because the switches will have 100M bit/sec Ethernet links between them. The routers connecting the switches to the Internet will probably have a DS-3 (45M bit/sec) pipe, with a T-1 (1.5M bit/sec) backup, Monteleone says.

Tullett & Tokyo will continue to use Cisco routers to connect to the Internet because the Foundry gear doesn't have WAN connections.

Currently, the company is still trying to determine the right number of servers to hook up. It will probably choose to connect five to10 of the "latest and greatest" Intel-based servers, Monteleone says. Foundry ServerIron switches include a load-balancing function for distributing Web requests among the servers in a round-robin fashion.

Cheaper to buy new

Tullett & Tokyo is now planning to install another Foundry switch to provide access from the Xylan network to the rest of the company. Currently a Cisco 7000 router fills that role.

But Monteleone found that upgrading the router to prepare it for the date change to 2000 was more expensive than buying a Foundry BigIron switch; updating software, memory and CPU would be factors. Plus, the router only supported 10M bit/sec Ethernet. Monteleone wants to migrate to faster speeds and is looking at Fast Ethernet and Gigabit Ethernet.

Faster speeds will be key as Tullett & Tokyo moves forward, with the Web and the beast at its heels.

"With trading information, delays are just not acceptable," Monteleone says. ◪

Cabletron,
continued from page 17

cerned with how switches compare on features, such as quality-of-service support, she says.

Cabletron's new switch features IEEE 802.1q tagging for virtual LANs and 802.1p for prioritization.

Cabletron boasts that it can support up to 4,096 VLANs per switch. The device has two priority queues.

Other features include wire-speed switching on all ports in half- and full-duplex mode, and support for more than 16,000 media access control addresses. The switch also features technology for handling flow control and broadcast control.

The SmartSwitch comes with a built-in Web server that allows users to configure the switch from any Web browser.

It also supports four groups of Remote Monitoring per port and port mirroring for fault isolation by a network analyzer.

Cabletron plans to let customers manage the new switch via the company's Spectrum enterprise and element management systems.

Users can pick from three physical interfaces for the switch's Gigabit Ethernet uplinks: 1000Base-SX fiber, 1000-Base-LX fiber and shielded twisted pair copper.

The uplinks also support Cabletron's SmartTrunk capability, which allows multiple network connections to be bundled into one high-speed pipe.

Cabletron: (603) 332-9400

More
Online

- SmartStack overview from Cabletron.
- News about Gigabit Ethernet offerings from other vendors.

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Internetworking Monitor . Kevin Tolly

A REALITY CHECK ON 'OPEN SOURCE'

When *The Washington Post* runs a front-page story on "open source," as it did in December ("The Spreading Grass-Roots Threat to Microsoft," Dec. 3, 1998), you know the subject has widespread implications.

Yet, for all the attention, many commentators make a fundamental and flawed assumption that making source code available (hence the name "open source") is necessarily an anticapitalist move that could hurt a vendor's bottom line. "Somewhat akin to Coca-Cola Co. releasing its formula" is how *The Post* put it. Hardly.

Furthermore, *The Post* article perpetuates the myth that open source is a "concept once confined to the computing fringes, but one that has forged dramatic mainstream inroads in the recent months."

Unless one considers a company such as IBM in the 1970s to be part of the "computing fringes," the writer is wrong again.

I fear that today's movement that equates "open" with "free software" has got its semantics — if not its priorities — wrong. The current "economic doomsday for Microsoft" approach may result only in making Microsoft even more recalcitrant. A reality check is needed.

What open source advocates should do is lobby Microsoft to adopt the same stance vis-a-vis source code that IBM took with its mainframe software. IBM published the source code to its mainframe operating systems and virtually all subsystems, including the corporate jewel — the CICS transaction processing system.

As a systems programmer in the early 1980s, most of what I learned about the complex inner workings of these systems came from studying the microfiche of source listings that IBM made available to customers — for a small additional licensing fee. This information, along with heavily documented control blocks, message manuals and, in some cases, logic manuals allowed us to understand enough about our systems to keep them running.

Just because I could look at the source code — and attempt to learn from it — did not mean that IBM had given up its rights to charge a license fee for this intellectual property. IBM charged nontrivial fees to all users of its mainframe software. And charge it should — creating and maintaining that system software was an expensive proposition for IBM.

Did open source code ruin IBM's mainframe business? Absolutely not. To this day, customers willingly (if not happily) pay to use this software to run their businesses.

That policy was the catalyst for countless small companies that built everything from monitoring and diagnostic tools to entirely new subsystems, such as security and tape/disk management.

Most importantly, these entrepreneurial developers didn't have to secure IBM's permission to create their products. They didn't need to or want to steal IBM code, they simply needed to know how IBM's products worked so that they could interact with them.

One could argue that these "competitors" stole business from IBM, but I believe that they added far more than they took.

If Microsoft continues to keep source code secret, thus preventing others from doing things that Microsoft would never have the resource or the motivation to do, it will surely come back to haunt the company.

Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (732) 528-3300, ktolly@tolly.com or www.tolly.com.

[*] Weight varies by configuration from 4.4 to 4.8 pounds. [†] For hard drives, GB= billion bytes. Operating system installed. ©1999 Compaq Computer Corporation. All rights reserved. Intel, the Intel Inside logo and Pentium are registered trademarks of Intel Corporation. Compaq and the Compaq logo are registered trademarks. Armada is a trademark and Better answers is a service mark of Compaq Computer Corporation.

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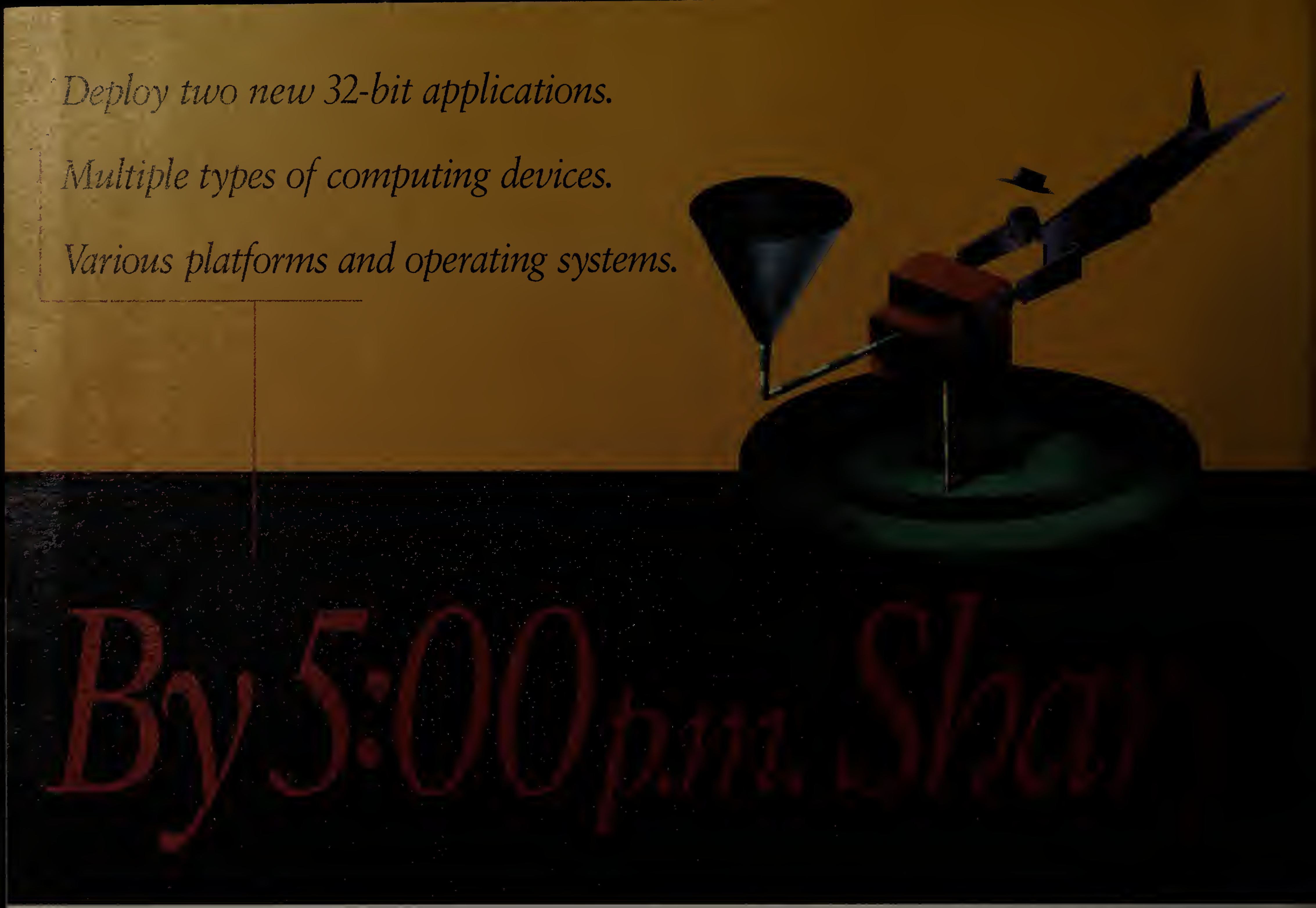
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Carriers & ISPs

The Internet, Extranets, Interexchange and Local Carriers, Wireless, Regulatory Affairs

Briefs

AT&T has expanded its effort to provide local residential service by signing a joint venture with **Time Warner.** The companies will deploy telephony services in 33 states using Time Warner's cable facilities. That effort will add to the coverage AT&T expects to gain with its pending acquisition of cable giant Tele-Communications, Inc. AT&T will own 77.5% of the Time Warner venture and for 20 years will have exclusive rights to offer telephony services over the company's cable network. Time Warner has upgraded about 85% of its system to two-way hybrid fiber/coaxial cable; the remainder should be completed by the end of next year.

PSINet last week said it will expand wireless Internet access service to 50 southern U.S. markets, Japan and Europe by year-end. Starting at $395 per month, PSINet InterSky will provide dedicated high-speed wireless 'Net access using digital microwave technology in the unlicensed 2.4-GHz spread spectrum band. The service is already being offered in selected states. Service speeds up to 128K bit/sec are available now with a 512K bit/sec service coming in the third quarter of this year. Service at 2M bit/sec is expected next year.

PSINet: (703) 904-4100

ISP **EarthLink Network** is hoping to provide stronger service-level agreements (SLA) by supporting a new management system. EarthLink recently signed a three-year deal with **Inverse Networks** to use its IP InSight SLA system to monitor performance of the EarthLink net. InSight offers features such as Web page download times and dial-in success rates. With this information, EarthLink will develop new SLAs.

EarthLink: (800) 395-8425

Bell Atlantic wants more

Being an RBOC just isn't good enough anymore.

BY TIM GREENE

NEW YORK — Bell Atlantic has big plans to break out of the regional Bell operating company mold.

As part of that plan, the company this year intends to introduce ATM switched virtual circuits, OC-12 speed ATM and IP fax services. Bell Atlantic is also scouting for partners and companies to buy in order to become a key network service player, says Joseph Farina, president and CEO of Bell Atlantic's Data Solutions Group.

"We can't be an RBOC and be a success in this marketplace," Farina says.

More Online

- Overviews of Bell Atlantic's recent acquisitions.
- A look at AT&T's efforts to move into the local loop.

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A big step toward success is Bell Atlantic's purchase of GTE, a $53 billion deal expected to be completed by June. The GTE purchase will give Bell Atlantic a nationwide presence in local markets as well as possession of GTE's long-distance and cellular networks.

Long distance is key to Bell Atlantic's future because 35% to 40% of all long-distance traffic originates in its territory. Bell Atlantic is pushing hard to win federal permission to sell long distance in New York state and is likely to win that permission sometime this year.

Being the main provider for a geographic region that's home to more than one-third of the Fortune 500 companies, Bell Atlantic plans to cater to their huge network needs, Farina says. That means the company will need connections to carriers across the U.S. and internationally, as well as more high-speed connections.

"We can't be an RBOC and be a success in this marketplace."

Joseph Farina, president and CEO of Bell Atlantic's Data Solutions Group

In that vein, the company by mid-year will offer ATM switched virtual circuits. The service will provide the options of unspecified bit rate (UBR) or variable bit rate (VBR) traffic control features.

UBR is a best-effort feature that grabs as much quality of service (QoS) and throughput as it can get, but when congestion occurs, UBR traffic is dropped first. VBR provides peak and average bandwidth. Customers will pay a flat fee based on bandwidth and QoS. There will be no usage-based service.

Bell Atlantic will also boost its maximum ATM service bandwidth to OC-12, or 620M bit/sec. Farina says customers providing video streams to buildings in New York need bigger pipes than the current maximum OC-3 links.

In an effort to support customers' IP traffic, the company will also introduce IP switching into the core of its network using its Ascend switching platform. The platform will map IP priority schemes to ATM virtual circuits to maintain QoS across the carrier's network.

Any acquisitions will be used to beef up Bell Atlantic's core services, such as its physical network. For something less central, such as systems integration, it would probably partner with another company, Farina says. ◪

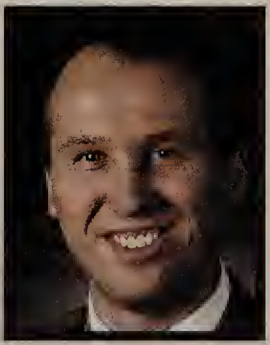
MCI WorldCom refreshes, repackages security

BY DENISE PAPPALARDO

Looking to give users a menu of network protection options, MCI WorldCom Advanced Networks is offering a slew of repackaged security services.

The lineup includes:

- Advanced Networks Authentication, which lets customers provide Security Dynamics or Secure Computing's token-based authentication systems for all remote access employees. With the service, each user's password changes every few seconds. Advanced Networks Authentication is available for $875 per month for 100 users.
- Advanced Networks InterManage Firewall service, a combination of multiple managed firewall offerings. InterManage is a fully managed service that lets users choose between a Check Point Firewall-1 stateful firewall or an ANS-developed InterLock proxy firewall server. A stateful firewall looks at where traffic originated and from what port, while a proxy firewall looks more closely at the data, says Jason Comstock, group manager for security and dedicated VPN services at Advanced Networks. InterManage costs $2,000 to $4,000 per month, per site.
- Turnkey Firewall, a service in which Advanced Networks owns the firewall, but customers control security from their nets. Turnkey lets users choose between Check Point or InterLock firewalls and costs $999 per month.



Comstock says Advanced Networks has revamped its firewall services.

MCI WorldCom Advanced Networks: (614) 723-1070

Eye on the carriers . David Rohde

THROWING FUD AT QWEST

The Network World Frame Relay Showdown at ComNet/DC '99 pitted seven carriers — the Big 3 plus US WEST, Intermedia, Infonet and Qwest — against one another.

As we've reported, technical issues got a good workout. But also at the forefront were political issues — especially those threatening the smaller carriers with our old friends fear, uncertainty and doubt.

Michael Johnson, Intermedia's senior director of enhanced engineering, was asked if his company's strategy of linking local regional Bell operating companies' frame relay clouds would become obsolete if the RBOCs were authorized to enter the long-distance data business. He said absolutely not.

"Networks can't be built overnight," he said. RBOCs would have to hang onto their Intermedia connections even as they built out their own far-flung packet networks, he said: "The number of frame relay switches is just too extensive out there. No one carrier can duplicate it." Besides, Intermedia and the RBOCs often price frame relay at half the cost of long-distance carriers' offerings.

Brad Hokamp, Sprint's director of advanced data services, defended the pricing patterns. The cost of new fiber that's laid to carry increased demand has to be recovered somehow, he said. Then Hokamp and other panelists went after one of the lowest-cost providers, Qwest.

One of my showdown partners, Atul Kapoor, senior vice president of The Tolly Group, noted that the Big 3 all have well-established managed router programs, but Qwest doesn't, raising questions about the company's experience even among users who don't necessarily want managed contracts.

"We do run into that often," said Mack Greene, Qwest frame relay and ATM product manager. But he added that Qwest's prices are 30% to 40% below those of the Big 3. He also noted that Xerox's professional-services arm, XeroxConnect, provides managed frame relay for Qwest under a partnership agreement.

Hokamp noted that Sprint has a 20-year track record as a data specialist. But Greene turned the issue on Sprint, saying that over the past year, Qwest has hired dozens of engineers away from Sprint and other large carriers. Greene then seized on the question of voice over frame relay, noting Qwest doesn't have an installed base of circuit-switched voice customers to cannibalize. Here's where Qwest's fat pipes — up to OC-12, or 622M bit/sec, and eventually higher — come into play.

Most frame relay carriers oversubscribe their frame relay networks. Just as airlines and hotels overbook in the expectation that some people won't show up, frame relay carriers generally allow multiple customers' virtual circuits to be assigned to routes in the backbone, figuring that data application traffic is inconsistent and varies throughout the day. But if users start making phone calls over such a shared network at peak business hours, the net could crash.

In Qwest's case, the fat pipes — and the fact that frame relay runs on Qwest's single frame/ATM backbone network — means "we're able to keep oversubscription to zero on the backbone," Greene said. "That gives us a leg up."

Can that counter the FUD from the big carriers? It'll be fascinating to find out.

Rohde is a senior editor with Network World. *He can be reached at drohde@nww.com.*

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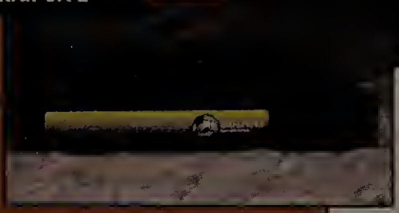

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CARRIER SERVICES

Don't wait for the big guns to deliver integrated access

BY DAVID ROHDE

Wade Oliver faced a classic dilemma confronting the growing legion of network managers who handle data and voice traffic. The IS manager for Arizona Community Physicians, a Tucson company providing administrative services for local medical offices, had to get the company's 24 sites on frame relay to run applications from a mainframe host. That meant Oliver had to provide some form of dedicated access line to each site to connect to the carrier's frame relay switch.

Arizona Community Physicians had many of its sites on 64K bit/sec frame relay links to MCI WorldCom. It also had either switched voice trunks or separate voice T-1s to US WEST for local calls and MCI WorldCom for long distance. Oliver decided that was inefficient. His solution was to turn to E-spire Platinum, an integrated voice/data access service from competitive local exchange carrier (CLEC) E-spire Communications in Annapolis Junction, Md.

With this service, E-spire places a box called an integrated access device (IAD) — a combination channel bank, fractional T-1 CSU and multiprotocol router — at every customer location. The box carves out a 64K bit/sec access line to E-spire's frame relay switch and assigns as many other 64K channels as needed to local or long-distance voice.

What's more, with the IAD and the T-1 already in place and connecting to the E-spire point of presence, the carrier has visibility all the way through the local access line. That made the migration from MCI WorldCom to E-spire frame relay — and the establishment of brand-new frame relay sites — a snap. "They can just plug a card in the channel bank and boom, you have frame relay," Oliver says.

Best of all, as Arizona Community Physicians migrates its applications to an all-IP intranet that may require more than 64K bit/sec for frame relay ports, it can readily move up to 128K bit/sec or higher.

Behind the label

Integrated-access services have been in the spotlight recently as Sprint and AT&T have announced grandiose schemes to deliver broadband voice, data and Internet on one access line. But Sprint's Integrated On-Demand Network (ION) and AT&T's Integrated Network Connection (INC) services are mostly in trial stages, while small carriers are offering them commercially.

Among them are E-spire's Platinum service and the SingleT service from Intermedia Communications, a CLEC and independent long-distance carrier in Tampa, Fla. GTE also has an entry called FlexGrow.

> **Small carriers already provide voice and data on a consolidated T-1.**

But the integrated access field — consisting of the service providers and the manufacturers of the boxes placed on the customer premise — is a welter of OEM agreements, rebranding and private labeling, which can make it difficult to know exactly what you're buying.

For example, E-spire generally uses Carrier Access Corp.'s AccessBankI or AccessBankII, devices that split voice and data traffic over a T-1 trunk (see graphic). Intermedia uses the T-1 Integrator from Vina Technologies. GTE generally employs equipment from Premisys Communications, which makes a scalable line of IADs.

Premisys' IAD line begins with the single-rack unit SlimLine, moves up to the single T-1 unit StreamLine and continues to Premisys' flagship, the IMACS concentrator, which supports up to eight T-1s. Premisys supplies many other carriers, but those carriers or their distributors use private labels to mask the boxes' origin.

For example, telecom distributor XEL Communications remarkets the SlimLine under the name "XPP 2000 Integrated Access Solution," while the StreamLine is labeled the XPP 4000 and the IMACS boxes the XPP 6000, 8000 and 9000. Adding to the confusion, Lucent resells Premisys boxes under the name "Adaptive Access Concentrator."

But because it's often provisioned as carrier-owned equipment, many users aren't concerned with who makes the box, as long as it reduces their costs. For example, Arizona Community Physicians now gets 64K bit/sec frame relay for as little as $80 per month per site with E-spire. The company was paying as much as $400. Long-distance toll rates have come down to 6.5 cents per minute from a high of 12 cents per minute.

Likewise, Matt Gallant, IS manager with Kyser Fine Furnishings in Montgomery, Ala., last year moved from a T-1 access line from BellSouth to E-spire Platinum. The cost went down from $1,790 to $825 per month, even with the Carrier Access box thrown in, Gallant says.

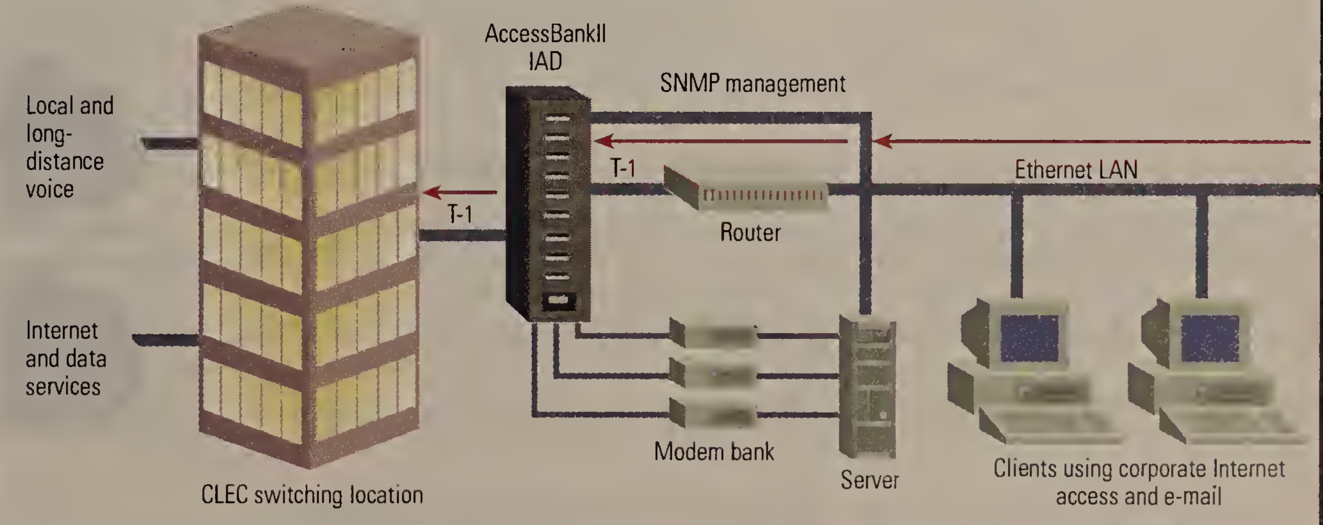
In search of compression

But these services aren't for everyone, particularly large users that want to put more than 24 channels on a T-1 before they spring for a second branch-office access line. Part of the promise of Sprint ION and AT&T's INC, which are due to provide dynamic bandwidth allocation, is their ability to change channels from voice to data to Internet on the fly as traffic needs shift.

"Our box doesn't provide dynamic bandwidth allocation," concedes Jim Diestel, Premisys' senior director of strategic planning. "Once a call is up there, it's up there, reserved at a full DS-0 [64K bit/sec] rate." Most of these IAD devices don't perform voice compression. To do that, users either have to add another piece of equipment to the mix or spring for an ATM edge device. ◪

All together now

The carrier-owned integrated access device (IAD) – in this case, Carrier Access Corp.'s AccessBankII – feeds traffic associated with the corporate network and the Internet via a single T-1.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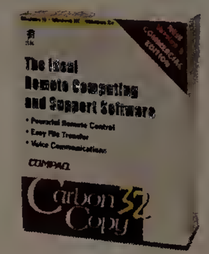

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Briefs

Compaq last week announced a family of separately priced products called the Enterprise Suite for Microsoft Exchange Server. Components of the suite include:

- Approval Expeditor, server software for routing simple forms, such as time sheets. It costs $1,495 for a five-client license.
- Correspondence Manager, server software for managing distribution lists. It costs $1,495, plus $5 per recipient.
- Work Expeditor, software for document management and workflow. It costs $2,950.
- Enterprise Vault, an e-mail storage and retrieval server, which costs between $325 and $35,000, depending on the number of users.

Approval Expeditor will be available in late spring. The other products are available now.

Compaq: (800) 345-1518

Oracle last week gave a demonstration of the Oracle8i Appliance and announced a partnership with **Dell Computer** to manufacture future server appliances. The Oracle8i Appliance, previously code-named Raw Iron, is a thin server that combines the kernel of Sun's Solaris operating system with the Oracle8i database and four Intel processors. The product, offered as an integrated hardware-and-software platform, is designed to be used to access the Internet and intranet applications.

Internet Security Systems last week started shipping Database Scanner 2.0. The new version has the capability to perform vulnerability checks and establish user policies for a Sybase database. Previously, the product worked only with Microsoft SQL Server. Database Scanner 2.0, available for download from www.iss.net, starts at $995 per database server.

IN-SITE: *Lessons from Leading Users*

Auto parts distributor bets on XML for e-comm

BY ELLEN MESSMER

Conventional wisdom says you have to use the World Wide Web to practice e-commerce with your trading partners.

But Worldpac, an auto parts importer and distributor, thinks HTML, the authoring software of the Web, is a dead end. This is because the data format is too rigid and Web browsing is too slow, says Mike Hellweg, vice president of IT at the Worldwide Parts and Accessories Corp.

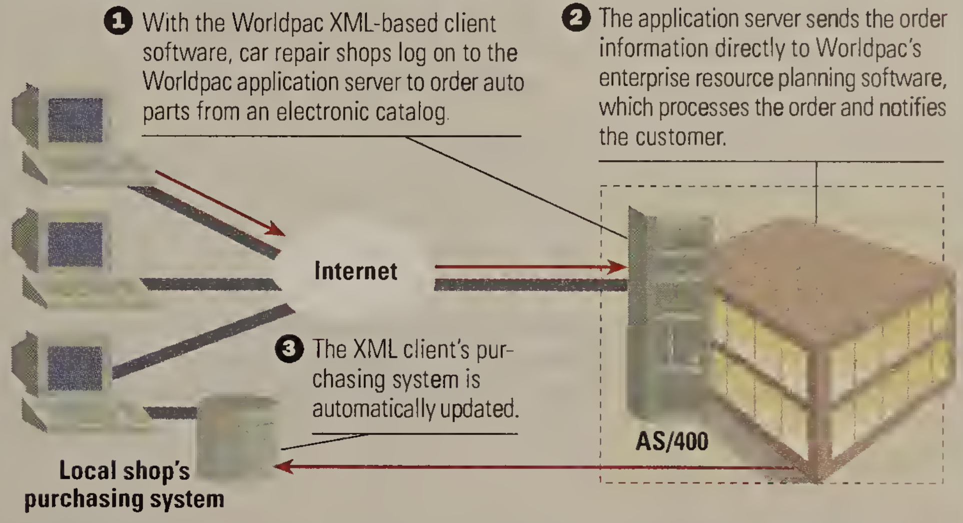
According to Hellweg, the better option is deploying applications based on Extensible Markup Language (XML), allowing for an easier way to exchange documents and images for online searches and content management.

XML can become "our real-time Electronic Data Interchange" because the developing markup standard allows business data from one application to be transferred directly to where it should be added to another, he says. And Worldpac wants to have its customers — primarily garage-shop mechanics — not only purchasing parts from electronic catalogs, but also downloading business data directly into their own desktop applications using XML.

See **IN-SITE**, page 30

Who needs browsers for e-commerce?

The Worldpac extranet uses thin clients with pure XML connections to let car repair shops more easily purchase auto parts over the World Wide Web.


❶ With the Worldpac XML-based client software, car repair shops log on to the Worldpac application server to order auto parts from an electronic catalog.
❷ The application server sends the order information directly to Worldpac's enterprise resource planning software, which processes the order and notifies the customer.
Internet
❸ The XML client's purchasing system is automatically updated.
AS/400
Local shop's purchasing system

Web site e-mail can be a black hole

BY PAUL MCNAMARA

NOVATO, CALIF. — Texaco may answer your e-mail inquiry faster than it takes to fill your tank, but don't hold your breath waiting for a snappy reply from most other U.S. corporate giants.

As a matter of fact, a surprising number won't answer your missive at all, presuming they deign to provide an e-mail address in the first place.

That's the gist of test results showing the time it took the nation's 100 largest corporations to respond to a simple e-mail question sent to their Web sites. The test was conducted by Brightware, a software vendor that helps companies manage the volumes of e-mail their sites generate.

A Brightware researcher visited 100 sites, found the most obvious generic e-mail address and sent a message asking for the location of the corporate headquarters. Among the results:

- 15 answered within three hours. Texaco led the pack at four minutes.
- 22 managed to reply within a day.
- Four took more than a week, including Hewlett-Packard, which pulled up the rear at 23 days.
- 10 flat-out failed to respond, including MCI WorldCom, United Technologies and Home Depot.
- 26 companies provided no e-mail address or kept it well hidden. These include General Motors, Exxon and United Technologies. Another 12 required visitors to provide personal information before they could send e-mail.

"I was surprised that a few companies did as well as they did," says Brightware CEO Chuck Williams. "I was also surprised there were 10 companies that actively invite e-mail questions on their Web site and just don't bother to answer them."

One of the latter insists that its failure was an aberration.

"This was an unfortunate circumstance, and we definitely try to get back to our customers as quickly as possible," says Charlie Sutlive, a spokesman for MCI WorldCom. "Our goal is to respond within 24 to 48 hours, [and] in December our response times averaged under 24 hours."

Mark Levitt, an analyst with International Data Corp. in Framingham, Mass., says, "Assuming the survey results are accurate, this indicates that many companies do not yet recognize e-mail as an important mode of communication. Responding to an e-mail within one to five days is reasonable. Anything longer should be considered excessive and a sign that the company is not truly open for business on the Web." ◪

More Online
- Details of the Brightware survey.
- Overviews of companies that offer e-mail response outsourcing.

FIND IT ON FUSION
DocFinder 1426

ATM encryption: faster, easier

BY ELLEN MESSMER

If you're using ATM equipment in your network, there's now a way to encrypt that voice and data traffic at very high speeds.

Celotek has just unveiled the latest version of CellCase, an ATM encryption unit that will encrypt up to 622M bit/sec speeds when it ships mid-year. It may well become the first commercially available standalone device to encrypt ATM voice and data at such high speeds. The alternative, a unit from GTE, is available only to U.S. intelligence organizations and their contractors.

As was the case with GTE, Celotek managed to fund its ATM encryption research with a U.S. Department of Defense grant, according to Celotek President and CEO Ghias Massarani.

Celotek ships a 155M bit/sec version based on a Sun SPARC machine. Massarani says the product is used by organizations such as the Union Bank of Switzerland.

Automatic Pilot

If you don't want to install and maintain your own security gear, there are firms, such as Pilot Network Services in Alameda, Calif., that will do it for you.

Pilot recently announced a new intrusion-detection service it calls the "heuristic defense infrastructure." It's an intrusion-detection filtering service that takes every incoming and outgoing packet stream transmitted by a corporate T-1 line and analyzes it for patterns that would reveal hacker activity, says Pilot President and CEO Marqueta Silvera.

> **If you don't want to install your own security gear, there are firms that will do it for you.**

"This heuristic defense infrastructure is based on our own software development for automatically inspecting IP packets, along with the human expertise of our security experts to take action," Silvera explains. She claims Pilot's heuristic technique helps discover unknown network attacks by detecting anomalous patterns.

Pilot typically charges a $12,000 setup fee for the firewall and ISP, with a $10,400 monthly fee for various types of security assistance, which might include secure remote access for corporate employees or encrypted links.

The basic idea is that any corporation that decides to go with Pilot's security management services runs a dedicated T-1 line directly into one of Pilot's centers, instead of to an Internet access point.

Silvera says the firm counts Sun, Lucent, Hitachi, Wilson and Kaiser Aluminum among its growing roster of customers. She says one client, Global Marine, is willing to run T-1 lines all the way from Houston to Chicago to get Pilot's security service.

Pilot uses about 16 security products from other vendors to provide the managed service. ◪

IN-SITE,

continued from page 29

Hellweg isn't afraid to put his money where his mouth is, and has budgeted up to a half million dollars to get Worldpac's trading partners going with XML. Worldpac, which each year sells $150 million worth of auto parts to repair shops, is building its entire e-commerce effort around a 100% XML-based server instead of a Web server.

Worldpac's Hellweg says XML is the way to go for e-commerce.

Worldpac is going to distribute XML client software from ThinLink Solutions to its repair-shop customers rather than asking them to use Web browsers. Worldpac expects to be using ThinLink's XML server, now under development, within a few months.

"Browsers are just the terminals of the '80s," Hellweg notes with some scorn. "Web sites are really designed for just surfing, not for dedicated use of a business-to-business application."

With the XML server, Hellweg says he'll have a much faster, more powerful way for his customers to order parts than they do today.

Now, Worldpac uses a ThinLink application server and an AS/400 server running a combination of inventory and customer information enterprise resource planning software from Intelligent Business System. People accessing the ThinLink application server via the Internet see the Worldpac electronic catalog of auto parts. This can be quickly searched with a custom-made TCP/IP-based Windows client that Worldpac gave to mechanics to use from their desktops. Users can place orders or download pricing information.

While the custom Windows client has delivered the speed and ease of online ordering Worldpac wanted, Hellweg sees even bigger gains in using XML.

Mechanics still spend a lot of time taking the pricing data they download from Worldpac and typing it into desktop applications from vendors, such as WinWorks Software and Snap-On Tools Co., to create repair estimates, he says. With XML, Worldpac thinks pricing data can be downloaded directly into these software applications.

"We'll have the ability to integrate our client application with the other applications on our customers' desktops," Hellweg says. ◪

'Net Insider . Scott Bradner

IDENTIFY THE USER, NOT THE PROCESSOR

Intel claimed it was just trying to enable electronic commerce. But what the company did was only marginally useful for e-commerce, scared the bejeezus out of privacy advocates, and got Intel headlined dead center at the top of *The New York Times'* front page.

Intel thought it would be a good thing to be able to tell one computer from another, so the company added a unique serial number to each of its new Pentium III processors. There are a number of reasons this might be useful. Intel suggested the serial number could be used to tell e-commerce users apart on the 'Net. It also could be used to track down stolen processor chips and computers. In a throwback to some mainframe software, the serial number could let vendors tie software licenses to individual machines. Because these goals seem reasonable, Intel must have been shocked by the reaction to its announcement.

Privacy groups reacted quickly and very negatively. Here was something that could become the Internet equivalent of a Social Security number — something that could be used to identify a user wandering around the World Wide Web. At the minimum, this could spawn unwanted sales e-mail and calls; at worst, it could be used to build dossiers on Internet users.

The press quickly picked up on the privacy groups' vehement denunciation of Intel's plan. Intel then wasted little time in announcing that the serial number feature would be disabled by default, and a user would actively have to turn it on.

This did not satisfy the privacy groups because browsers and other software could surreptitiously re-enable the serial number feature at any time. The privacy groups have now asked the Federal Trade Commission to force Intel to recall any early Pentium III chips that have been shipped and prohibit Intel from shipping any more with the feature.

Ironically, while a serial number is a legitimate worry to people who would like to preserve what little privacy we have left, it is not reliable enough to be used in e-commerce. E-commerce requires the identification of an individual, but a processor serial number identifies the processor in a computer. Because users switch between computers and many computers are used by multiple people, a processor serial number identifies the wrong thing for e-commerce.

It would have been far more useful if Intel had worked instead on an inexpensive and reliable smart card and reader. If PCs came equipped with such readers, users could plug in a card to identify themselves when engaging in e-commerce and not at other times. Users could anonymously buy packs of these smart cards to use in different activities or with different vendors.

Disclaimer: Education via e-commerce is a new topic at Harvard, and the university has expressed no opinion on the above.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@harvard.edu.

Technology Update

Evolving Technologies and Standards

By Steve Blass

Ask Dr. Intranet

What is the best operating system to use to host intranet services for a company with 1,000 to 1,500 employees?
Via the Internet

The quick answer is Linux, but the right answer isn't quite so straightforward.

The best operating system for the job is the one with which you have the most in-house expertise.

Unix is stronger than Windows as a large-scale, multiprocessing, multiuser server platform. But there's no reason to learn Unix if you have the resources to provide Web services on Windows or any other platform. If you're running a Novell shop, for instance, you can put your intranet on top of NetWare. You've got a number of choices in the PC and Unix worlds for implementing intranet e-mail, Web services, database access, file sharing and business application services using TCP/IP.

The most important thing to consider when establishing an intranet is not the operating system but the alignment of intranet services with business objectives. Define your business requirements, pick the software that best meets them and then pick the hardware that best supports those systems.

Because you can support 1,500 users almost equally as well with Windows or Unix servers, the choice comes down to what your organization can best manage and support once the intranet begins to thrive.

As a network architect at Sprint Paranet in Houston, Blass understands the strain of developing and managing intranets. Send your problems to dr.intranet@paranet.com.

Moving wireless LANs into fast lane

BY JOHN LANGLEY

A new generation of wireless Ethernet technology could raise the bar for wireless LANs. Dubbed 100BaseRadio, the technology takes advantage of three newly allocated Unlicensed National Information Infrastructure (U-NII) frequency bands dedicated to high data rate communications systems.

Using multiple channels at 5.2 GHz, 5.3 GHz and 5.775 GHz, 100BaseRadio can provide significantly more bandwidth than other wireless LAN technologies offered today. And because multiple channels are available, interference is not an issue.

Most wireless LANs currently operate at the increasingly crowded 2.4-GHz frequency, where they compete for airspace with signals from microwave ovens, cordless telephones and other consumer electronic products. Forced to compensate for the heavy interference in this band, wireless LANs can support only 1M to 2M bit/sec throughput. These data speeds can limit the types of business applications wireless LANs can support.

In a nutshell, 100BaseRadio allocates 100M bit/sec Ethernet capacity to multiple users by using 10 to 12 independent 10M to 20M bit/sec channels spread across the three U-NII 5-GHz bands. Each channel remains at an assigned frequency within a single band. Data bits are allocated to the channels through a highly efficient modulation technique that converts digital data to electrical signal pulses.

The modulation works like an on/off toggle switch. Using 100BaseRadio technology, a wireless transmitter switches on and off millions of times per second to code data onto a carrier frequency. The data pulses through radio airspace like electromagnetic Morse Code.

Network managers can prioritize data traffic by assigning channels, similar to the way they allocate bandwidth through an Ethernet switch. Power users might have an entire 10M to 20M bit/sec channel to themselves, while other LAN users might share the bandwidth in a channel.

With a high-speed wireless network, companies can support more users, each with different application needs, in the same geographical region. And because the connectivity is wireless and channel frequencies are fixed, users can roam within the coverage area and still remain connected to the LAN.

One of the biggest drawbacks to lower speed wireless LAN technologies is the tight bandwidth limitations they impose. Even for legacy applications, 1M to 2M bit/sec becomes a bottleneck. Further shortcomings arise in lower speed wireless technologies used with popular business applications.

For example, because the PowerPoint presentation program has files that can reach the multimegabit range when colorful graphics and embedded video clips are included, it can quickly degrade low-speed wireless LAN performance.

With multiple channels providing between 10M and 20M bit/sec of data throughput, 100BaseRadio should provide more than enough bandwidth for even the most media-rich applications, including DVD and MPEG-2 running at 3M bit/sec to 8M bit/sec, and high-definition television at 19M bit/sec.

Like its predecessor — wireless 10M bit/sec Ethernet — 100BaseRadio complies with critical network standards, including IEEE 802.3 Ethernet, 802.1d (spanning tree), and new extensions to 802.1 that will support IP priority queuing and IP virtual LANs. As a result, these technologies are fully compatible with Ethernet wired networks and all the business-critical applications they support.

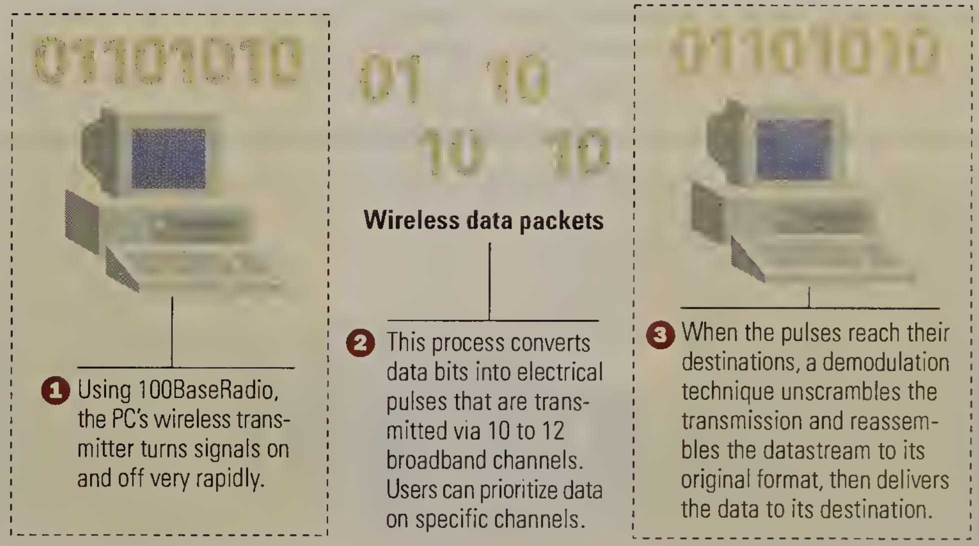
Vendors could charge between $190 and $375 per computer, depending on configuration. At this price, the initial cost of deploying a high-speed wireless LAN is roughly equivalent to that of deploying a wired LAN. But the lifetime operational costs of wireless LANs can be substantially less than those of wired LANs, particularly in environments requiring frequent modification.

Langley is chief technology officer at RadioLAN in Sunnyvale, Calif. He can be reached at (408) 616-6300 or jlangley@radiolan.com.

HOW IT WORKS

100BaseRadio

High-speed wireless 100BaseRadio technology is used to switch a carrier signal on and off millions of times per second to code data onto a carrier frequency. Customers can also prioritize data traffic similar to the way they allocate and prioritize bandwidth through an Ethernet switch.



❶ Using 100BaseRadio, the PC's wireless transmitter turns signals on and off very rapidly.

❷ This process converts data bits into electrical pulses that are transmitted via 10 to 12 broadband channels. Users can prioritize data on specific channels.

❸ When the pulses reach their destinations, a demodulation technique unscrambles the transmission and reassembles the datastream to its original format, then delivers the data to its destination.

Need Information

Let *Network World* provide a quick primer on an important or emerging technology. If you have an idea for Technology Update, contact Michael Cooney at (508) 875-6400 or michael_cooney@nww.com.

Gearhead — inside the network machine . **Mark Gibbs**

A NEW FORM FOR FORMS

I love neat ways of doing things — ways that save time. The other day, I received a really cool e-mail message from a public relations company. It wasn't the pitch that interested me but rather what the content could do.

The company wanted to update my contact information and get feedback on whether I was interested in its clients, so it sent me an HTML form. Note that I wrote "sent me an HTML form" and not "sent me a link to an HTML form on some Web server somewhere."

To get people to complete a form by e-mail can be done three ways. The most common has been to send them those ugly text forms (as in "name:[ ]") and expect them to fill in the blanks.

Unfortunately, at least 50% of respondents screw up — people put the data outside the brackets, insert a blank line after the question and enter text there, and so on. I think they do it on purpose.

More effective is to send the URL of the form. With a modern e-mail client, URLs are recognized and become hyperlinks. But even then, using a link is slow: the user clicks on the link, his browser fires up, the browser accesses a Web site and (unless he's lost interest by now) the user fills out the form. He then has to return to his e-mail client. Very slow.

The third way is to put the form in the e-mail message, as the public relations company did. Even better, the public relations company had filled in fields for me to correct (the company was using my street address from two moves ago).

The company also used hidden fields in the underlying HTML form coding so that it could include tracking data. That meant when I hit the Submit button, the company would be able to take my updated and extended response and relate it to an existing record. That's neat.

The technique relies on the recipient being able to handle HTML e-mail, a facility that is not guaranteed to work for every e-mail client.

The e-mail client must be able to interpret the contents to build the display in much the same way that browsers do (in fact, under Windows, the e-mail client often handles HTML data by handing it off to the default Web browser running as an in-place OLE server).

There are a few rules about what you can put in HTML e-mail and how you do it. For example, you can't use frames, page anchors or custom backgrounds with the most current e-mail clients.

Another group of things that unfortunately can't be guaranteed to work in HTML e-mail forms are Java applets, ActiveX controls, plug-ins and embedded JavaScript.

You also have to use absolute links. Relative links make no sense in HTML e-mail, as the context — the source of the content — is the e-mail client.

And of course, the e-mail client (or subsystem handling the form) must be able to establish an HTTP connection to the target server.

If you're going to send HTML e-mail — with or without forms — to other Internet users, you need to make sure that you send the messages only to those people who can read them.

It is a little different on an intranet, where you can usually be more cavalier on the grounds that you know what users should be running.

So which e-mail clients support HTML e-mail with forms? Well, all of the leading e-mail clients from Microsoft, Qualcomm and Netscape do, while older programs such as cc:Mail and MS Mail do not.

This is a technique well worth exploring not only for capturing information from staff and clients but also as part of your systems management. Want to try it out and see if you can handle an HTML form? Send a message to htmlform@gibbs.com, and we'll see how you do.

Comments and suggestions to gb@gibbs.com.

Network World Fusion Spotlight

News, tips and tools from our Web site

Brains before beauty

You can put up all the pretty toolbars you want, but if your Web site doesn't have a good search engine, you're going to frustrate people.

Surprisingly, one of the more frustrating sites on the Internet right now is Intel's.

Recently, we wanted to get some information on the new Pentium III chip — this was before Intel redesigned its home page to highlight the beastie. So we clicked on Search, typed "Pentium III" and hit Enter.

The results page had plenty of links to pages about the Pentium III, but many of them were in Italian, German or French. And many of the pages in English had descriptions that consisted mainly of JavaScript snippets or such meaningless babble as "&nbsp;&nbsp;&nbsp" — meaningless, that is, unless you're a particular fan of the HTML code for a blank space.

Now, we have nothing against other languages (not even JavaScript). But a multinational company should be able to figure out how to let users select the language of documents they want to see. It's a relatively trivial thing to do if you use meta-tags in documents to identify a language.

What's particularly ironic is that, as far as we could tell, all of Intel's online documents have these tags in place. Why, then, doesn't Intel use them? And why doesn't the company's search engine filter out HTML and JavaScript tags?

Clarification

Last week, we said hacker Kevin Mitnick was in jail on charges of stealing credit card numbers. Although this was an allegation made after his 1995 arrest, he was not charged with this. Instead, he faces a spring trial (he has been held without bail since his arrest) on charges of allegedly stealing proprietary software, intercepting electronic communications and breaking into a federal computer system. Read more online.

DocFinder: 1435

Pick of the week

The newly minted Linux 2.2 made its debut late last week with new features and many bug fixes. Chief among the enhancements is support for symmetric multiprocessing, IPv6 and SPX. Support for new hardware includes Gigabit Ethernet, Fibre Channel and more.

Version 2.2 also expands the number of platforms on which the operating system can run, with support for Sun's 64-bit UltraSPARC and the PowerPC family of processors. Grab the kernel and other useful Linux tools here.

DocFinder: 1423

Help the help desk

A help-desk staffer who recently completed NetWare 4.X training asked Fusion users what sort of NetWare questions he could expect.

One of the most common is, "How come the printer isn't working?" to which the answer is most often, "Check it for paper."

DocFinder: 1345

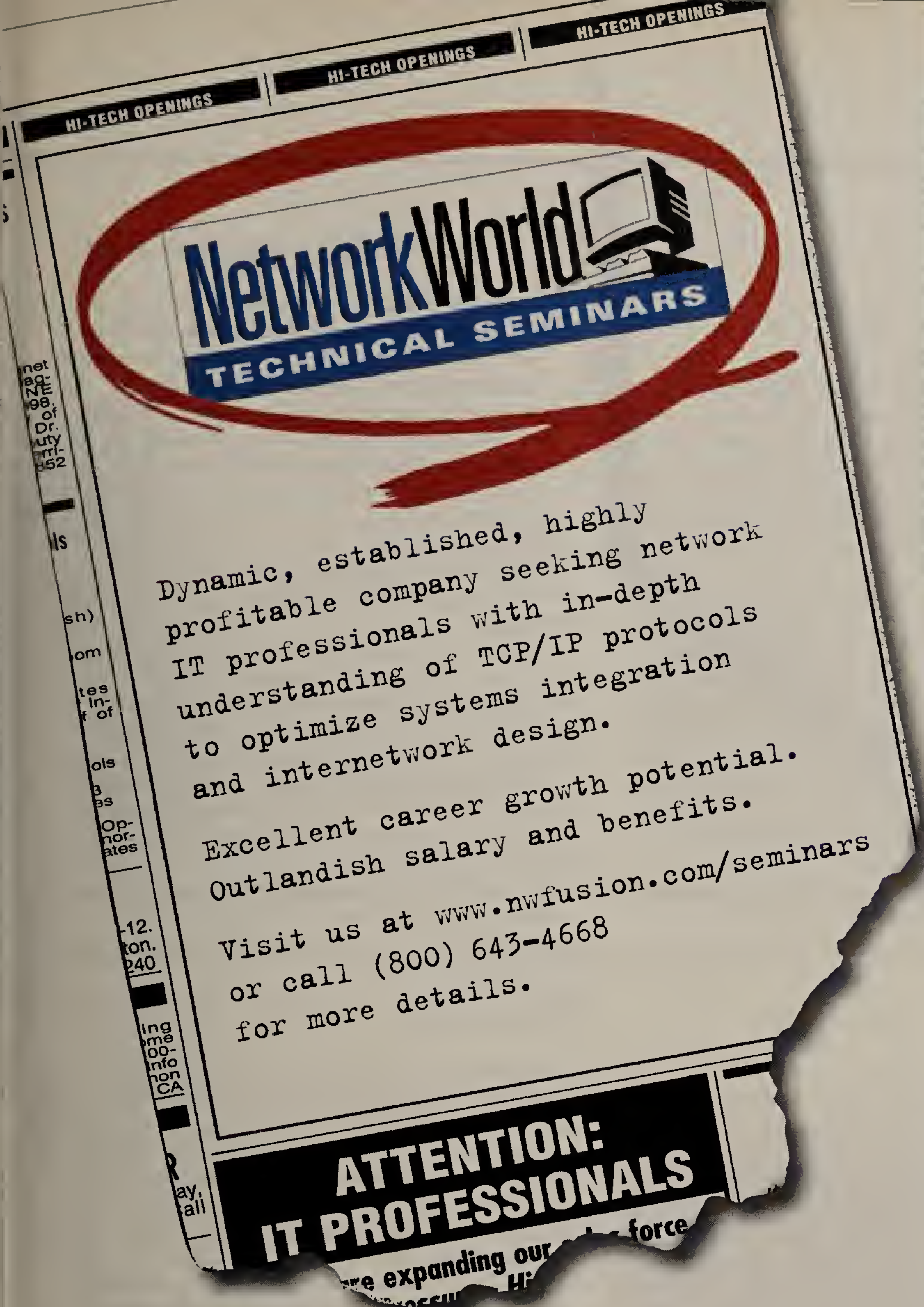
Microsoft refund day

So how many of you will be shipping your Windows 95 disks back to the manufacturer on Feb. 15 for a refund?

That's "Windows Refund Day," when Linux users and other rebels say they're planning to try to get a refund for the operating system that came installed on their computers even though they didn't want it. Get more background on the effort here.

DocFinder: 1425

www.nwfusion.com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Maximize Your Potential

Understanding TCP/IP:
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PROGRAM OVERVIEW

TCP/IP has become the standard you must be well versed in if you work in an Internet- or intranet-centric environment. An in-depth and clear comprehension of TCP/IP is essential for network administrators, analysts and PC support staff who need to understand the practical applications of this ubiquitous protocol — not just the theory behind it.

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TECHNICAL HOT POINTS

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- Study the functions of the supporting protocols, such as ARP, RARP, DNS, BOOTP, RIP and OSPF
- Understand how IP-based routing works
- Learn how you can integrate the application protocols, such as TFTP, FTP, TELNET, SMTP and HTTP into a TCP/IP environment
- Understand the operation of SNMP, the Internet standard for network management

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Opinions

Editorial Insights

AT&T is being hypocritical on access

C. Michael Armstrong has done a terrific job turning AT&T around. The acquisitions he's announced, the marketing strategies he's embraced and the renewed vigor he's instilled in AT&T's employees have reawakened the communications giant, which had gone stale under former CEO Robert Allen.

It's clear that Armstrong is a straight talker, a man who speaks his mind and demands clarity in thinking and planning. But Armstrong is speaking out of both sides of his mouth when it comes to the issue of access.

Armstrong and AT&T have long and loudly demanded access to regional Bell operating company networks. But Armstrong vows to scrap his deal to buy Tele-Communications, Inc. if the Federal Communications Commission requires that TCI's cable TV connections be opened to other ISPs.

America Online and other ISPs are squawking about this access issue, demanding regulators ensure cable customers have freedom of choice when it comes to ISPs. RBOCs say they want to be able to deliver competing video services over cable links.

AT&T's opponents have a legitimate concern. With its TCI acquisition and separate deal with Time Warner, the largest cable provider, AT&T will be able to deliver phone and Internet access to some 40% of U.S. homes. AT&T wants TCI affiliate @home to be the Internet provider of choice to those cable customers, shutting out AOL and others.

Clearly, any restrictions imposed by the FCC — which could approve the AT&T/TCI deal this month — would lessen TCI's value, so Armstrong's opposition to open access is understandable.

But why does Armstrong expect RBOCs to invest heavily in the infrastructure for, say, digital subscriber line, and then open it all up for resale to AT&T and others? AT&T wants unfettered freedom to build the network of tomorrow, but it also wants to use the regulatory system when convenient to squeeze potential competitors.

Because it is unlikely AT&T will own up to this hypocrisy, the FCC needs to act. Access is no longer just an RBOC issue, and regulators need to ensure that AT&T and other companies don't abuse the system of access regulation for their own gain.

— *John Gallant*
jgallant@nww.com

Message Queue

CRIME AND PUNISHMENT

Winn Schwartau's article on cybervigilantism ("Striking back," Jan. 11, page 1) and Mark Gibbs' follow-up column ("Virtual crime, real world jail time," Jan. 18, page 62) generated some heated feedback. Here is a sampling of readers' comments:

I was outraged after reading your story on cybervigilantism. If it is true that Lou Cipher has ordered or taken part in the burglary or physical assault of an alleged hacker, then he is no different than a street thug and should be prosecuted. What if a 15-year-old student doing homework one night gets his face smashed because one of Cipher's "security team" members gets an IP address wrong? If a corporation has enough information to pinpoint the exact location of an alleged attacker, then it has enough evidence for a criminal prosecution.

I have no problem with electronically defending yourself. But anything beyond that goes way over the line.

Daniel Szalay
LAN administrator
Howard Miller Co.
Zeeland, Mich.

I started to fill in *Network World's* survey on cybervigilantism, based on Winn Schwartau's article, but gave up when none of the multiple-choice responses seemed the appropriate answer to most questions.

In Schwartau's article, Joseph Broghamer, information assurance lead for the U.S. Navy's Office of the Chief Information Officer, is quoted as saying: "Offensive information warfare is not a good thing . . . period. You want to block, not punish. There is no technical reason to react offensively to a hacker attack."

This is the option that's missing from the survey. No one has any business considering offensive software (much less a physical offensive) until he's done what he can to harden his perimeter against intrusion. The attitude that it's OK to attach an unprotected network to the Internet — and then punish anyone who intrudes or attempts to intrude — mystifies me.

I think the message to network maintainers everywhere should be: get your house in order and protect your perimeter. Evaluate the services you're providing to the outside world, and take the time to see that they're as secure as they can be. Don't think about offensive software until you do these things.

Mark McCutcheon
Research engineer
Department of Computer Science
University of British Columbia
Vancouver

Lou Cipher is wrong and dangerous. But what do you do when the world wrongs you? In 1990, my house was broken into, and even today I would love to take a baseball bat to the people who did it.

Once I was pushed up against a wall and asked if I had any money. The only reason I didn't make the 6 o'clock news like Bernard Goetz is because I didn't have a gun on me.

Yes, Lou Cipher is wrong, but unfortunately I can relate to what motivates him. Such is our world.

Kevin Thomas
Network manager
Inpro
Muskego, Wis.

I consider an attack on my computer to be an assault on my person. This is no less of an offense than trying to rob me of my wallet, which validates the use of force. Computer hackers are lawbreakers of the worst kind, in that they don't even have to face their victims. More power to Cipher.

Pat Biggs
Elizabeth, Colo.

Ultimately, the only long-term way to stop cracking is to track the crackers and remove their havens — their ISP access to the 'Net — much as the Navy did with pirates in the Caribbean. It's very difficult to be a pirate if you can't put your boat in the water.

Ken Graham
Systems engineer
Galileo International
Denver

Send letters to nwnews@nww.com or John Gallant, editor in chief, Network World, *161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.*

More
Online

- More letters about cybervigilantism.

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HI THERE! YOU MUST BE LOUISE... SAY, YOU'VE GOT A PIECE OF SPINACH STUCK IN YOUR TEETH...
I UPGRADED TO THE PENTIUM III!

Management Mode . **Jeff Shapiro**

ADVICE TO THE NEW BOSS ON THE BLOCK: MAKE CHANGES SLOWLY

Welcome to Management Mode! In this new regular column, I'll be your guide through the sand traps and minefields of Information Technology management.

I really am the new kid on the block today. Not only is this my first column for *Network World,* but I've been working in my current position as technology coordinator for the Kingsport, Tenn., city schools for only a couple of months. Prior to this, I was a program manager for a large computer peripheral manufacturer in San Diego.

Making the transition to a new job in a new city is challenging. But it's important to remember that your new staff is going through a major transition, too. How can you ease the path from there to here for all concerned?

Start by recognizing that getting a new boss is one of the most stressful things employees can endure. All of a sudden they're working for someone they don't know and can't relate to, and worse, they have no idea how their performance is going to be evaluated. You could change everything overnight, making their jobs completely different and them completely miserable. But the best advice is to go slow. Take time to sit down with your employees, preferably in a group. People tend to be braver and more honest as a group, so if you want the real skinny, talk to the mob first. Then, take time to talk to staffers individually and get to know them.

Listen to their concerns and address them as soon as you can. Praise employees who are good at their jobs in order to increase their confidence level and sense of job security.

Don't expect to retain everyone. Transitions typically bring periods of introspection, and a few employees may very well decide to seek greener pastures. You can raise your stock with the remaining staff by replacing departed employees quickly, with people who are a good match to the personalities already in place. If you can find these replacements in house, so much the better.

One word of caution: If you have to make cuts, make them before you do anything else. Going through the exercises above and then whacking a few heads will tell your staff that you aren't to be trusted. A two-way sense of trust is critical, because good staff is hard to find and even harder to replace these days.

The people side of information management is something we usually prefer not to deal with until we absolutely have to, and that's a shame. Building good relationships with everyone with whom you come into contact not only gives you some job security, but it also makes your job easier and a whole lot more fun.

Shapiro is technology coordinator for the Kingsport, Tenn., city schools. He can be reached at jshapiro@Kpt.k12.tn.us.

Speaking the LANguage . **Linda Musthaler**

LINUX GATHERS CRITICAL MASS NEEDED TO COMPETE WITH NT

Like a snowball getting larger as it rolls downhill, Linux continues to gain momentum. As the worldwide development community continues to add functionality and connectivity options to Linux ("SNA development ties Linux to mainframes," *NW,* Jan. 18, page 1), the "renegade" platform becomes more mainstream — and more viable as a widely accepted enterprise server platform.

Many in the IT community have known for quite some time that Linux is a stable, reliable and inexpensive network server operating system. In fact, if the one-sided debate of Linux vs. Windows NT in last fall's Network World Fusion forum is any indication, most technical network administrators would much rather install and support Linux that any server operating system offered by Microsoft.

The general acceptance of Linux is a chicken and egg thing. More companies would choose Linux to host their business applications if the independent software vendors (ISV) would port their software programs to the Linux platform. And the ISVs would port their software if they knew that more companies would buy the Linux version to host their business applications.

Leading ISVs, such as Oracle and Corel, already have taken the plunge to deliver their commercial software applications on Linux. With big-name ISVs now in the Linux camp, many smaller ISVs are sure to follow. (Oddly, even Microsoft has lent credence to the viability of Linux, by claiming in recent court testimony that Linux is a threat to Microsoft's operating system business.)

Hardware companies, too, are jumping on the Linux bandwagon. Dell already sells servers preconfigured with Linux. And server king Compaq is expected to announce a deal with leading distributor Red Hat Software to pre-install Red Hat's latest version of Linux on some models of Compaq servers. Compaq currently offers Linux on its servers, but only on large, customized shipments. This new deal could very well turn the tide for Linux as a commercial network operating system.

Deals like the Compaq-Red Hat one are what business managers who control the IT purse strings need to see. Business people don't care a whole lot about technical superiority. But they do care about the ready availability of commercial solutions, technical support and integration expertise — all the things Microsoft has been able to deliver around Windows NT.

Until recently, getting support for your Linux system might have been a touchy issue for management. Network administrators were largely dependent on online forums and user groups to answer questions and offer help. Not that this is a bad thing, but business managers prefer to know they have a specific commercial resource identified for support. Now that companies such as Caldera Systems and Red Hat are commercially distributing Linux, business managers feel they have an accountable vendor that can provide support.

Large, successful technology companies are beginning to invest in the commercialization of Linux, legitimizing the long-term prospects for this particular piece of freeware. Intel, Oracle and Netscape recently injected millions of investment dollars into Red Hat, giving the distributor enough working capital to form an enterprise computing division. Red Hat CEO Bob Young says the money will go toward operating system platform service, technical support, strategic alliances and "company responsibility" — all the things decision makers look for in an enterprise technology provider.

If you've been trying to convince your management that Linux is the right technical choice for a server platform, perhaps it's time to play the business angle trump card. Linux is inexpensive to acquire, can be purchased from multiple sources, has a growing number of applications, is endorsed by the industry's major technology players, has ready sources of technical support and is preferred by technology managers around the world. These claims are easy to substantiate and can be relayed in terms that business managers can understand.

Linux is quickly acquiring the critical mass it needs to give Windows NT Server a real run for its money. Nothing could be better for this industry than some good, old-fashioned competition for your business.

Musthaler is vice president of Houston-based technology consulting firm Currid & Co. She can be reached at linda@currid.com.

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FACE-OFF

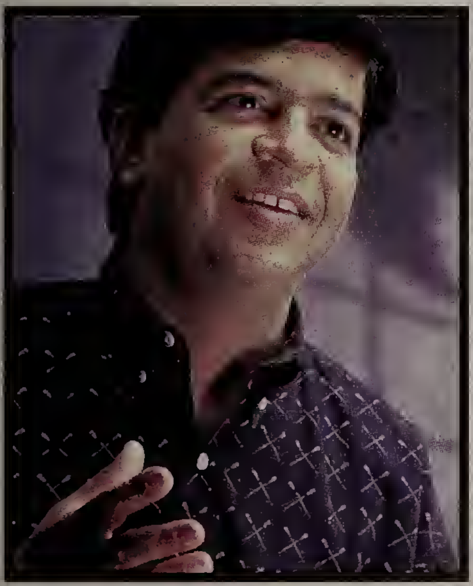
Layer 4 switching: Is it worth the hype?

Alteon says Layer 4 switching is for real; Nortel claims it's just an illusion.

BY SHIRISH SATHAYE

Make no mistake; Layer 4 switching is real.

Just ask the folks at Yahoo, Digex, Concentric Network, WebTV or Disney Online. They've all deployed Layer 4 switching technology to optimize their Web data center infrastructures, minimize application response times and improve overall traffic control.



Layer 4 switching is about managing and switching application sessions, not just individual packets. For years, the ability to prioritize bandwidth by application session or TCP flow has been dubbed a Layer 4 service, but it's not Layer 4 switching. Layer 4 switches can identify and process TCP/IP sessions at wire speed, thus providing new services.

For example, using a single virtual IP address, Layer 4 switches can load balance user requests to a virtual server made up of multiple physical servers that support the same applications and content. A Layer 4 switch intercepts new TCP requests to the virtual server, determines the best "real" server to handle each request and forwards packets associated with each TCP connection to each chosen server.

In the process, the Layer 4 switch must substitute the virtual IP address in the destination address field of each packet for the actual IP address of the chosen servers while monitoring the state of the TCP connection. This move ensures that all packets within each TCP connection are forwarded to the same real server in the proper packet sequence.

Layer 4 switching also enables application redirection. Layer 4 switching technology can be used to transparently intercept application traffic, such as HTTP, File Transfer Protocol and Domain Name System (DNS), and redirect the traffic to specific servers regardless of the destination IP address. Layer 4 switching technology can be expanded to redirect or load balance user HTTP requests based on information within the session content, allowing different object types to be physically stored on servers optimized for them.

So can Layer 2 and 3 switches simply add Layer 4 switching intelligence without fundamental architecture changes? If history is a good indicator, the answer is a resounding "no." Bridges added IP routing support, but no good multiprotocol router today ever resulted from architectures designed for bridges. Layer 2 and 3 switches that cram one or two Layer 4 services into their centralized management processors will ultimately collapse under the pressures of exploding Internet and intranet traffic.

There's no doubt that Layer 4 switching technology has become a critical data center component of Web hosts, content providers, ISPs and progressive Web-oriented enterprises. From now on, switches will never be the same.

Sathaye is vice president of engineering at Alteon Networks, a server switching company in San Jose. He can be reached at ssathaye@alteon.com.

BY TONY RYBCZYNSKI

Layer 4 switching is not worth the hype — but application-aware networking is!

Layer 4 switching is an illusion. You can't do switching without addressing, and there is no addressing at Layer 4. Layer 4 is an end-point function; Layer 3 does the addressing. But application awareness at Layer 4 and up — across your network or in front of your server farms — can solve real business problems.

MARIE-LOUISE DERUAZ

Layer 4 switching technologies use application information to provide preferential treatment in the switch. This application awareness is very important in achieving two key objectives for users: preferential treatment for certain applications and end users, and server load balancing and improved server application resiliency.

In an ideal world, applications would indicate their requirements using Differentiated Services, Integrated Services or IEEE 802.1p protocols. But most current applications can't do this. Therefore, application awareness is built into intelligent Layer 2 switches at the workgroup level, routing switches at the campus level, and routers and enterprise network switches at the WAN-edge level.

Server load balancing is less an end-to-end network function than an end-point optimization function, which again requires application awareness. To this end, a specialized class of products referred to as server switches, or server load balancers, has emerged. These products provide three levels of functionality, all geared toward choosing the best available server to handle client requests.

The simplest form of functionality provides balancing and redundancy on a local basis. The next level adds content awareness, allowing a customer query to be handled differently from a customer order. The third level extends the functions of the previous two levels across geographically dispersed servers and redirects traffic based on server proximity. Server switches require a high degree of customizability at layers 4 to 7 because the possibilities are unlimited.

This is just the tip of the iceberg. Under Nortel Networks Unified Networks vision, we see the convergence of data and telephony enabling a whole new range of applications. Delivering preferential treatment through application-aware networking across the enterprise not only meets the needs of data applications, but also enables new unified applications, such as packet telephony and interactive multimedia. The future for server switches is even more exciting, as they become an element of Internet-enabled call centers (or telephony-enabled Web centers) that blend all kinds of traffic of a company's choosing to enhance customer care, broaden markets and grow business.

So next time a vendor tries to sell you a Layer 4 switch, ignore the hype and challenge him. You have real business problems to solve.

Rybczynski is director of strategic marketing and technologies at Nortel in Ottawa. He can be reached at tonyryb@nortelnetworks.com.

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Online

Air your views on this issue in our Fusion Face-off running through Feb. 12. Sathaye and Rybczynski will be adding their thoughts to the discussion.

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NOVELL REBORN

The Upshot

Novell, once the undisputed leader in the network operating system market, lost that lead to Microsoft and has had to reinvent itself around a different but related technology: directory systems. But will the directory opportunity be enough to sustain Novell going forward? CEO Eric Schmidt certainly thinks so, and, assuming Novell has learned from its past missteps, we'd have to agree.

Novell
continued from page 1

But the history of technology is littered with the corpses of great products that lost out to inferior ones. Companies often fail to get the word out to the right people, can't garner enough third-party backing, or have trouble convincing potential customers that they will be around to provide support and upgrades.

Novell stumbled badly earlier in the decade, blowing a near-monopoly of the LAN server market with an ill-conceived attempt to challenge Microsoft on the desktop. This two-front war alienated independent software vendors (ISV), confused users and diverted resources and attention away from Novell's core network-services business.

The fast-moving world of high tech is usually unforgiving of such missteps. However, the growing need for an industrial-strength enterprise directory is providing Novell with a second chance, and the company is taking full advantage. After losing money in 1997, Novell shifted its focus to NDS and directory-enabled applications, and has now posted five strong quarters in a row (see graphic, page 40). All indications are that the reborn, refocused Novell will make a go of its directory strategy, provided it has learned from the mistakes of its past.

The gravy train

It's not NDS that will produce a steady revenue stream for Novell, at least initially. Rather, that job will fall to the applications that take advantage of the directory. These products — ZENworks, BorderManager, ManageWise and GroupWise — now account for 28% of Novell's product revenue and generate a big chunk of its service revenue as well, although the company doesn't break out that percentage. At any rate, the directory-related products comprise the fastest growing segment of the company's business, says Michael Simpson, Novell's director of marketing.

The applications are also driving sales of Novell's flagship NetWare product. According to market research firm International Data Corp. (IDC), the company shipped more than one million new servers in 1998, up from 927,000 in 1997. NetWare 5.0, released in September, is winning performance tests and exceeding sales expectations.

"This is not about abandoning one business and replacing it with another," Simpson says. "They are perfectly complementary." Still, NDS is clearly the strategic technology going forward, and the industry seems to be paying attention.

Novell is licensing NDS to all comers, the idea being to seed the market and make NDS a de facto standard that will increase demand for Novell's directory-enabled applications. While these licensing deals don't produce much revenue at this point, that may change down the road if third parties start including NDS in products instead of building their own directories.

The potential size of the directory services market is anyone's guess. Novell CEO Eric Schmidt has likened it to the SQL market, which he put at $80 billion. Other estimates range to "virtually infinite" if you consider all the various applications that may eventually be tied into a directory.

John Gantz, a senior vice president at IDC, says the Internet economy is fueling a huge need for directory services. "The environment will change so fast that network administrators won't know what hit them," Gantz told the attendees at the Novell Global Partner Summit last month in Snowbird, Utah. "Novell is maneuvering into the right place at the right time."

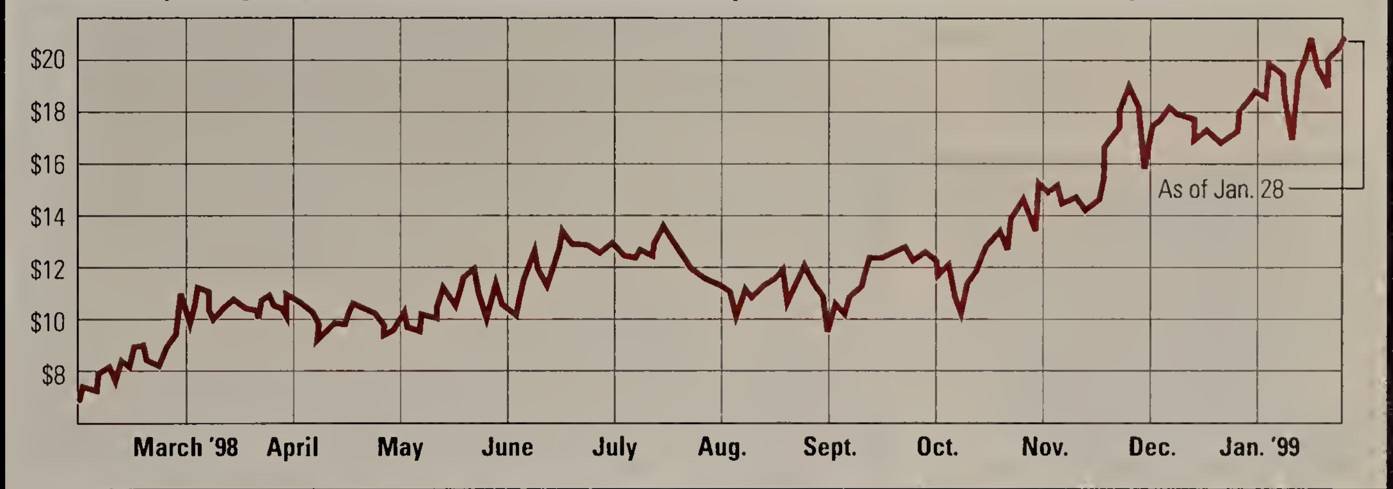
Third-party support

A directory service is strictly an enabling technology, so its value is measured largely by the number, scope and quality of the applications that use it. Third-party support, therefore, is critical. Historically, Microsoft has been king of the ISV game, but Novell is making strides of its own.

Novell last year set up a $50 million venture capital fund to dole out cash to firms building NDS applications; so far it has given out at least $20 million. Additionally, the company's "Get Off Your Apps" program provides development grants to start-ups building NDS applications. Officials say this program and other efforts increased Novell's ISV ranks five-fold in the past 18 months. More than 400 third-party applications that support NDS are now available, some from big name vendors such as PeopleSoft.

The market responds

Novell's improving financial status is reflected in its stock price, which has been on a steady climb.



"The phone has been ringing off the hook with calls from companies wanting to integrate their products with NDS," Simpson says. "These are companies that wouldn't do it a year ago." They showed up in force at last month's sold-out Partner Summit.

However, getting ISVs signed up and applications developed is just the beginning.

"Novell's support of development has improved quite a bit, but marketing support of developed applications is still nonexistent," says Robert Harbison, chief technology officer of voice-over-IP start-up StarVox, Inc., a Novell and Microsoft ISV based in San Jose. "That's where Microsoft is really great. Microsoft shipped NT 4.0 with a sampler CD full of third-party applications from its ISVs. Novell has to do a lot more to help promote NDS applications."

The type of application is important, too. Utilities that enhance NDS' ability to manage user account information in NetWare shops are fine as far as they go, but they won't help to sell NDS as an enterprise directory. Offerings that showcase NDS as a much broader directory service are imperative, and recent announcements from leading switch vendors as well as enterprise management specialist Tivoli Systems represent a big step in this direction.

As part of an agreement announced in December, Tivoli — a division of IBM based Austin, Texas — is working with Novell to use NDS as a central data store for network and user information collected or used by Tivoli's Inventory, Software Distribution and User Administration tools. The companies are also working on Tivoli agents for NetWare 4.X and 5.0 servers that will enable the servers to be managed from the Tivoli console.

NDS' unparalleled cross-platform support is particularly appealing to Tivoli. "Microsoft has traditionally misunderstood the importance of certain middleware technologies and how important it is for them to be cross-platform in nature," says Tom Bishop, Tivoli's chief technology officer. "Active Directory is fine for pure NT shops, but Novell's NDS strategy has some real appeal in the more heterogeneous environments that we target."

NDS is now available on Hewlett-Packard's HP-UX, IBM's AIX, Caldera's Linux and The Santa Cruz Operation's Unix. Novell is releasing NDS for Sun Solaris and IBM's S/390 this quarter. NT is already supported by NDS, but only in environments with at least one NetWare server. A version of NDS that runs directly on NT without NetWare is due out this summer; it will enable users to build pure NT networks but still employ NDS.

Switch vendors embrace NDS

Another part of Novell's strategy for boosting NDS' role in enterprise nets is getting switch vendors on board. The company has been scoring big with the likes of Lucent, Nortel Networks and Cisco announcing varying degrees of support for NDS (*NW,* Dec. 21, 1998, page 49).

At the switch level, directories provide an additional layer of security, and they ease administrative burdens by allowing for centralized device reconfiguration. Directories can also be used to automate the process of applying quality-of-service (QoS) and user-access policies to network devices.

Nortel. which last year acquired Bay Networks, is using a directory to build QoS capabilities across its entire product line, from the lowliest LAN devices to carrier-grade switches.

"Novell's collaboration with Bay will have NDS managing our backbone and doing Layer 4 routing when it is available," says Barry McGreer, a network administrator for Enesco in Itasca, Ill.

Some switch vendors have been working on their own directories, but they tend to be specific to their product lines. A neutral entity such as Novell is in a better position to provide an enterprise directory for a multivendor network.

"Novell already has a production-grade, scalable directory, and extending it to incorporate additional network elements such as switches and routers is very appealing," says Paul Parker-Johnson, product line manager for ATM network management and policy networking at Lucent's LAN systems group in Concord, Mass. "In terms of what's available for sale today, nothing compares to it."

NDS alternatives

Microsoft's forthcoming Active Directory for Windows 2000 is viewed by many as NDS' primary competition. However, Active Directory's ship date continues to slip, and it won't emerge as an enterprise-level offering in its first iteration.

"From what I have seen so far of the Windows 2000 beta, calling Active Directory a directory in the same sense that NDS is a directory is ludicrous," says Chris Miller, a network manager for a large chemical company. Windows 2000, he says, doesn't have the cross-platform support or scalability. Some doubt it ever will.

"I wouldn't be surprised if at some point Microsoft has to license NDS," says Jim Gagan, president of ThinkTank Network Technology Group, a reseller in Merrillville, Ind., that sells and installs Novell and Microsoft network products.

Similarly, the Lightweight Directory Access Protocol (LDAP) is no threat to proprietary directories such as NDS and Active Directory.

"LDAP has been oversold as a solution," says Bob Sakakeeny, an industry analyst with Aberdeen Group, a Boston-based market research firm that is starting a new practice dedicated to directory services. According to Sakakeeny, LDAP is merely a protocol that allows various applications to access a directory; it's not a directory in its own right. "As people begin to realize that, they will start looking at real products like NDS. NDS can act as a central repository with LDAP links to other vendors' directories."

> ***"The phone has been ringing off the hook with calls from companies wanting to integrate their products with NDS."***
>
> Michael Simpson, Novell's director of marketing

Netscape has been providing directory technology to service providers, a market in which Novell is showing increasing interest. However, Netscape views the information, not the directory, as the real asset, so the two companies' efforts are actually quite complementary. And the pending merger with America Online calls Netscape's directory business into question.

"Other ISPs are not going to want to use software that AOL owns," says Joel Achramowicz, a securities analyst for investment banker Preferred Capital in San Francisco. "And [Netscape's directory] can't compare to NDS in any case. AOL needs NDS to help manage its far-flung network."

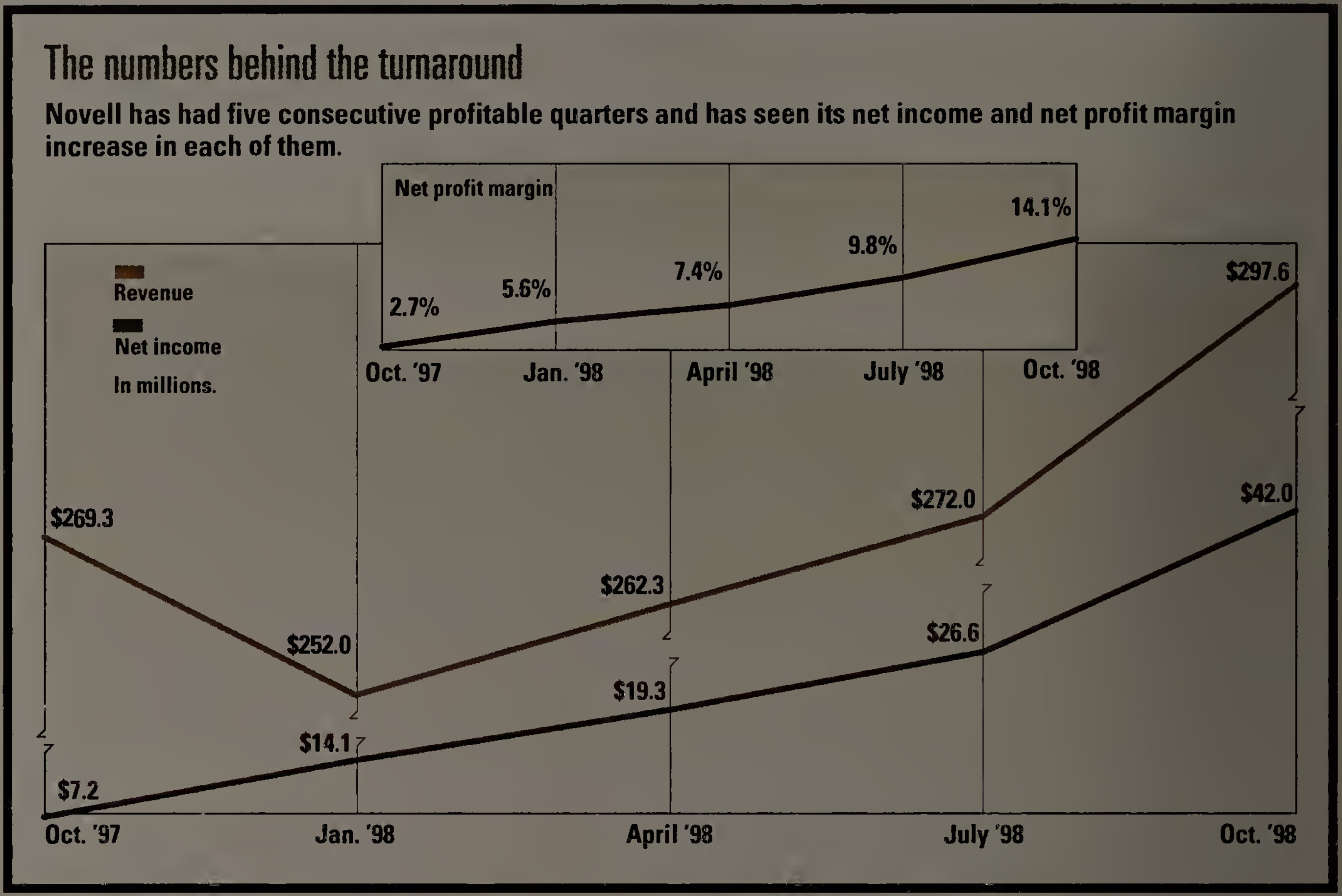
The big ISPs, and telecommunications companies in general, appear to be ripe for Novell's plucking. They operate networks with tens of millions of users, and "NDS is the most powerful, scalable, replicable, robust and flexible directory in the world," Achramowicz says.

Maritime Telegraph and Telephone in Halifax, Nova Scotia, is using NDS to provide customers with on-demand access to a library of educational, productivity and entertainment software over high-speed digital subscriber line connections. Customers "rent" the software and are billed monthly. A user interface built with the directory-enabled Novell Application Launcher (NAL) lets parents monitor usage, set spending limits and restrict access to specific titles.

Winning back corporate mind share

Few people question NDS from a technology standpoint, and its huge installed base is a matter of record. However, Novell has been dismissed as an enterprise-level provider by many business executives in the Fortune 500.

"Novell was on top and got dethroned," says high-tech marketing guru Geoffrey Moore, chairman of The Chasm Group in San Mateo, Calif., and author of *Inside the Tornado* and *The Gorilla Game.* "When that happens, the market is extremely reluctant to re-enfranchise such a company, even if it has the best product.



The numbers behind the turnaround

Novell has had five consecutive profitable quarters and has seen its net income and net profit margin increase in each of them.

"And the number of ISVs is meaningless," Moore adds. "The issue is what the power players are doing. Cisco and Microsoft have the strongest positions, so a solution that doesn't have their endorsement isn't likely to get very far."

Novell officials acknowledge that corporate minds tend to be set against them, but say they are chipping away at this resistance. Novell already does business with 83% of Fortune 1000 companies, and its sales to big customers are growing faster than its business as a whole.

"What we are encountering is the anxiety of breaking a trusted habit — populating desktops with as many applications as possible," says John Slitz, senior vice president of global marketing for Novell. "People need to start thinking instead in terms of populating networks and having robust, controllable, reliable connections to applications that exist out in a heterogeneous network. That's the dominant market for the next 30 years, and we can lead in that market."

Novell has always done well with network engineers and other technical types in user organizations, but the decision to go with something as strategic as an enterprise directory is made at a much higher level. Analysts credit CEO Schmidt with doing an outstanding job of getting the message to key decision makers, and they expect his efforts to start reaping significant dividends before year-end.

"Give it another six months," says Stephen Dube, director of technology research for investment banker Wasserstein Perella in New York. "Cisco's support was not driven by anything Cisco wanted to do, but rather by a groundswell of requests for NDS support from customers."

A compelling argument to sway top management is the impact of NDS on the cost of IT ownership.

"Now that products like NAL are out, people can really see how they cut the total cost of ownership dramatically," says Brian Legare, NT administrator for Lutherans Capital Management in Appleton, Wis. Before NAL, it took him 30 to 40 minutes to assign rights to a new application. NAL now lets Legare accomplish the task with the click of a button.

Miller, the chemical company's network manager, had the opposite experience during the past year when two job changes took him progressively further away from an enterprise directory. In the first job, he was dealing with a pure NetWare/NDS network that delivered 24-7 availability more than 99% of the time and required one administrator for every 200 users. The second job was with a company migrating to NT.

"In the middle of the process, it became clear that NT couldn't provide NDS functionality," Miller says. "But NDS for NT was just coming out, so we kept NetWare for file, print and directory services and used NT for applications servers." It took one administrator for every 150 users to manage this mixed environment.

Miller's current company is a pure NT environment using a multiple-master domain model. The network takes twice the number of servers per user, needs at least one administrator for every 100 users, and so far stays up only about 85% of the time.

"What have I learned? That a directory is critical to the network," he says. "Flexibility, reliability and security went down with each move I made, and it took more support staff and time to get the same things done."

JIM ROLLO

"NDS allows you to get away from the NT vs. NetWare vs. Unix argument and select the operating system that is best suited to each need."

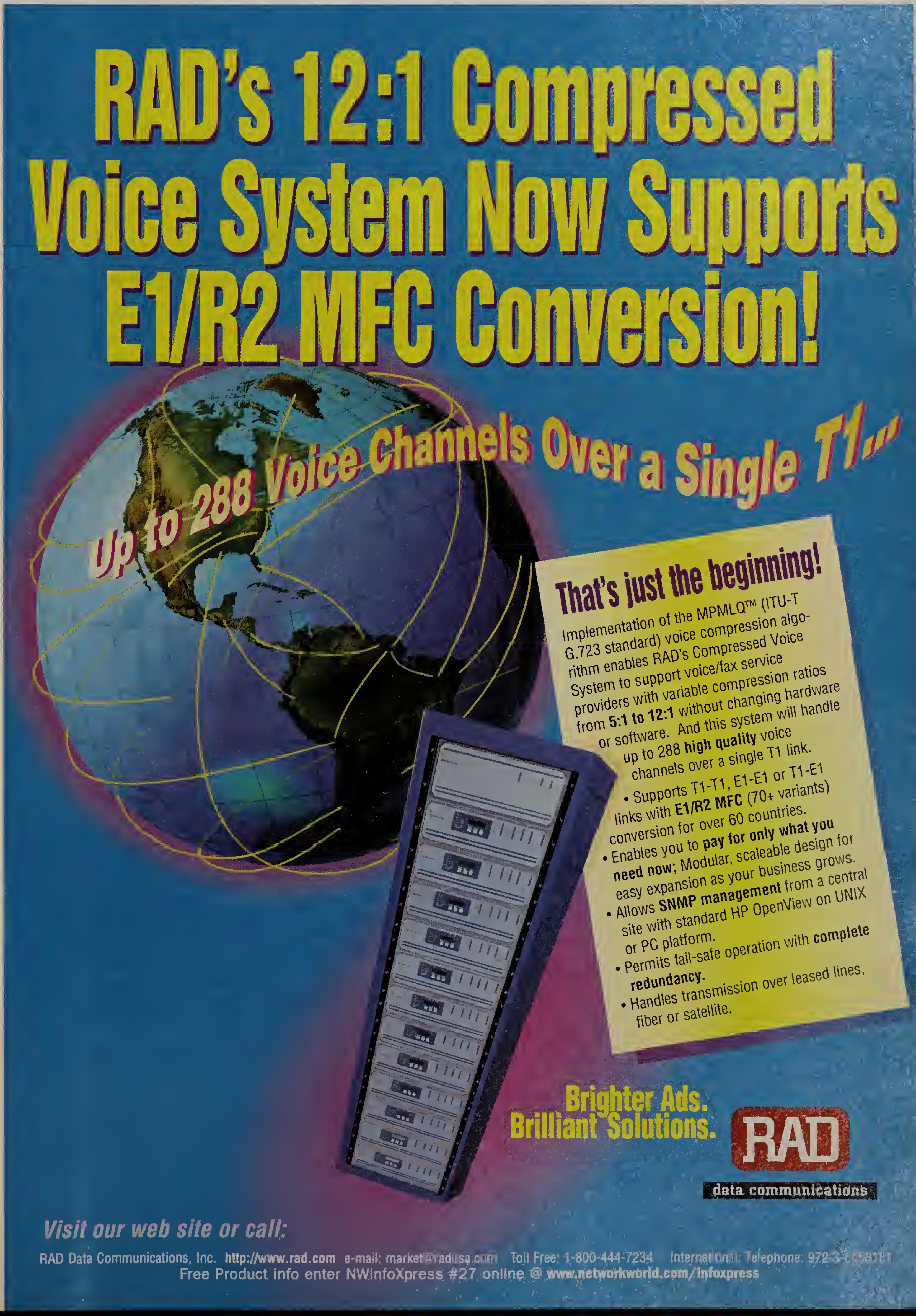
Chris Miller, net manager for a large chemical company

The bottom line

An enterprise directory is imperative as companies increasingly embrace network-centric computing. Companies that have been the most aggressive in pursuing e-commerce and extranets are hitting the wall hard. They need a powerful directory service to enable continued, manageable expansion into this new computing and business model. Networks can't be secured without a good directory, and trying to keep track of all the network objects and users without one is an administrative nightmare.

"NDS is the only thing that will truly help you with the skyrocketing administrative costs that most companies face," says ThinkTank's Gagan. It isn't unusual for NDS installations to have user-to-administrator ratios of 250 to 1, and Novell officials think 500 to 1 could become commonplace.

The advent of the World Wide Web



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and Java have created a network computing architecture that liberates front ends from back ends and clients from servers. This gives specialized operating systems and infrastructure technologies a new lease on life and enables users to select the optimal platform for the job.

"NDS allows you to get away from the NT vs. NetWare vs. Unix argument and select the operating system that is best suited to each need," Miller says.

To exploit the directory services opportunity, Novell has to assemble a compelling array of third-party applications that use NDS and extend well beyond the network-utility category. The company is well on its way with such victories as the Tivoli deal, but more is in store. Novell is reportedly negotiating NDS deals with enterprise resource planning (ERP) software vendors, including SAP and BAAN. These deals would enable administrators to authenticate ERP clients through NDS, so users don't have to log on to NDS and the ERP systems individually.

But the biggest challenge is to reach beyond the technology implementers and convince the business managers that NDS can reduce the total cost of ownership and provide their companies with a significant competitive advantage in the new millennium. Anecdotal evidence of such investment returns abounds, but it has to be backed up by systematic independent studies that quantify the savings across a broad user base.

The delay of Windows 2000 and Active Directory and the limitations of Active Directory as an enterprise directory service are providing Novell with a window of opportunity for NDS. The window won't remain open forever, and some experts think the market will wait it out and delay directory services deployment until the "right" company has a workable product. Novell disagrees, and for good reason.

More
Online

- ***NW* Columnist Dave Kearns on how NDS for NT brings fault tolerance to NT domains.**
- **A Novell white paper that explains how NDS for NT works.**
- **Our review of NetWare 5.0, which we deemed our 1998 Product of the Year.**

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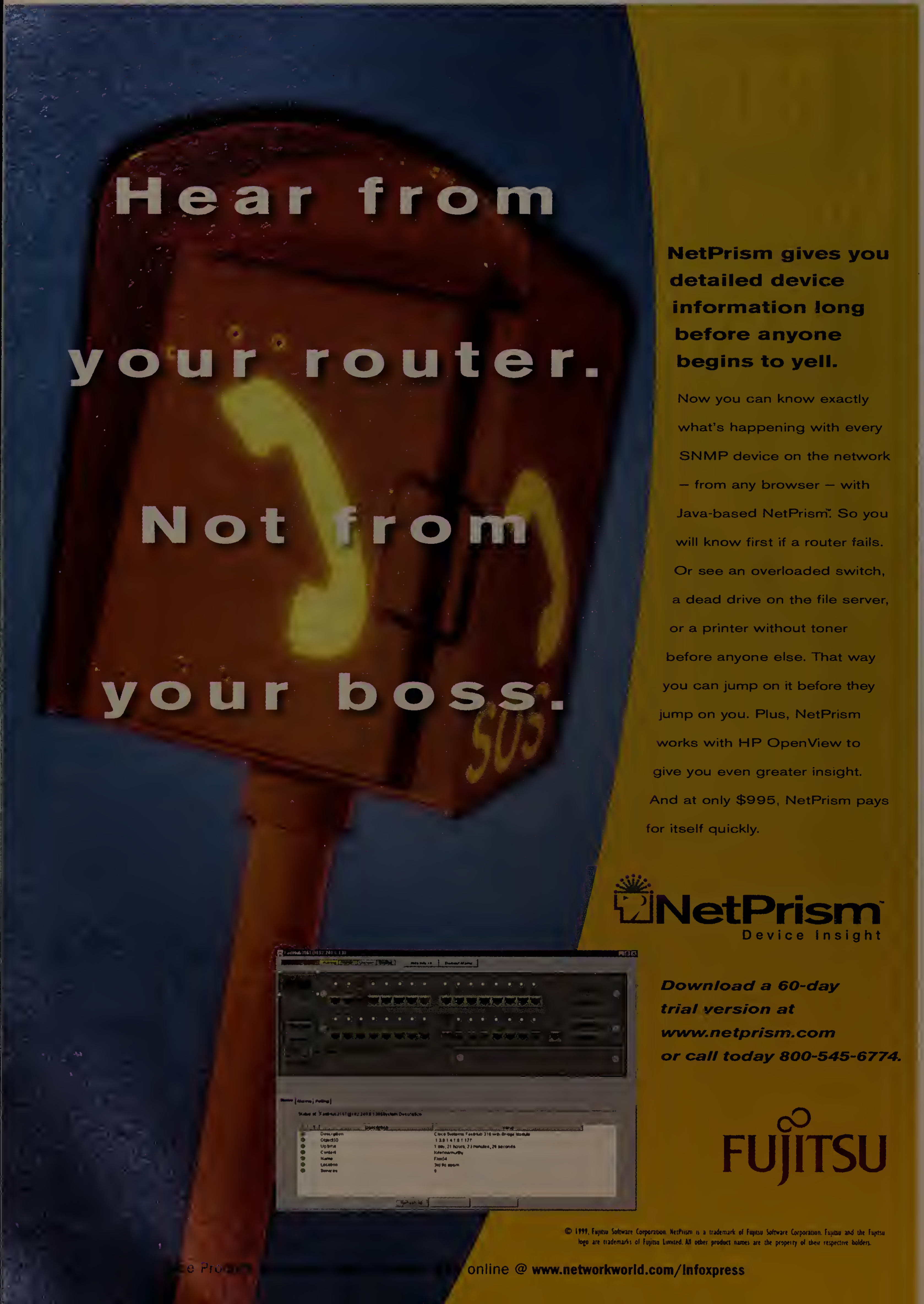
"Two years is 10 lifetimes in Internet time," says Novell's Slitz. "Businesses can't wait. They need it now, because if they don't do it, their competitors will. The penalties for waiting right now are higher than they've ever been in history."

This year is critical for directory services players as companies develop enterprise directory strategies and evaluate various approaches. Novell is on the right track toward positioning NDS as the one global directory that can get the job done now. There's no need to wait for Microsoft any longer. In fact, NDS is the technology that could make NT an enterprise platform.

Breidenbach is a consultant and freelance writer in San Mateo, Calif. She can be reached at SBreide@aol.com.



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Review

UNPLUGGING THE LAN

The first batch of products to support the IEEE 802.11 wireless Ethernet standard shows promise, not perfection.

BY CHRISTOPHER NULL

The recently ratified IEEE 802.11 standard for wireless Ethernet promises 2M bit/sec bandwidth at ranges of 500 feet or more — but don't believe everything you hear.

The 802.11 standard is the specification for spread spectrum wireless LAN technologies using multiple channels along the 2.4-GHz band. Its use of multiple frequencies helps prevent eavesdropping on radio traffic. The standard also adds a contention system to wireless nets, similar to the system used in Ethernet networks.

A flurry of new products based on 802.11 have just hit the market, but in our tests of the first standard-compliant Direct Sequence Spread Spectrum (DSSS) wireless adapters and access points, we found that none lived up to their claims of high throughput and long ranges. We also found generally disappointing administration utilities and subpar documentation.

On the other hand, interoperability testing was surprisingly smooth. All the vendors' adapters worked with the others' access points. Throughput tended to hover near the rating associated with the access point, no matter which vendor's adapter was employed.

Net Results

Nortel BayStack 660

Nortel Networks Wireless LAN Division
(510) 737-1600; www.netwave-wireless.com
$569, PC Card; $1,799, access point (includes one PC Card)

Pros

▲ Range champion
▲ The hands-down choice for wireless novices

Cons

▼ Weak throughput

Cabletron RoamAbout 2400

Cabletron
(603) 332-9400; www.cabletron.com
$495, PC Card; $1,295, access point

Pros

▲ Good 802.11 throughput, even at long range

Cons

▼ Complex terminal-based setup; shortest range
▼ Poor documentation and security options

Lucent WaveLAN

Lucent
(888) 584-6366; www.wavelan.com
$495, PC Card; $1,295, access point

Pros

▲ The all-around middle-of-the-road performer in speed and range
▲ Best for interoperability

Cons

▼ Reliability concerns

Aironet PC4800

Aironet Wireless Communications
(800) 247-6638; www.aironet.com
$795, PC Card; $1,995, access point (no PC Card required)

Pros

▲ Top throughput
▲ Nice design

Cons

▼ Complex terminal-based setup
▼ Shortest range
▼ Rocky installation
▼ Expensive
▼ Poor documentation

After extensive testing, we gave Nortel Networks' BayStack 660 our Blue Ribbon on the strength of its management utilities and range, despite the product's lackluster throughput. Aironet's PC4800 was the throughput champion, but the product suffered from poor administration tools and documentation and a high price tag. Lucent's WaveLAN and Cabletron's RoamAbout 2400 — the other products we tested — are both reasonable if not outstanding products.

We saw a definite performance/range trade-off in all the products. In general, the faster the throughput, the shorter the distance that can be traveled without signal degradation and, eventually, loss. Read our story on RadioLAN's high-speed wireless network for an extreme example of this law of wireless LANs (page 44).

We did our testing in a concrete-and-steel building in San Francisco, full of radio and electronic interference. While some vendors report ranges in open-space buildings — where there are no obstacles at all between antennae — of 300 to 600 feet, we saw much smaller ranges in our stress-testing environment. This real-world environment also likely explains why performance, even at 32 feet, is substantially off the 2M bit/sec specification.

Product: Nortel BayStack 660

Vendor: Nortel Networks Wireless LAN Division

Though its performance didn't stand out, Nortel's BayStack 660 won our Blue Ribbon thanks to its good range and straightforward management utilities.

NetworkWorld
Blue Ribbon

Surfing another kind of wave

Nortel's BayStack 660 package has an interesting genealogy. It started out as Netwave Technologies' AirSurfer Pro product. The company was purchased by Bay Networks, which merged with Nortel to become Nortel Networks. All packaging and labels still indicate this is a Netwave product, and all product support is available through the Netwave Web site.

Roaming with the BayStack PC Card is a pleasant network experience. If you leave the coverage area, the unit automatically reconnects you to the network when you reenter it. Of the products we tested, the BayStack had the best range at 88 feet. Unfortunately, it also had the worst performance at short range, with 1.11M bit/sec throughput at 32 feet and 0.97M bit/sec throughput at 70 feet. This isn't appalling, but it is slower than competing products.

BayStack 660's access point is housed in a flimsy piece of plastic with five unlabeled LEDs that ostensibly indicate connectivity status. It includes 10Base-T and 10Base-2 interfaces.

The Java-based setup and configuration utility for the access point is glacially slow but functionally complete. Once you launch the configuration utility, it traps the access point's periodic BOOTP requests and lets you assign a new IP address to the unit. Other advanced configuration options are probably not necessary for most users. The access point can also be managed through SNMP tools. As with all DSSS products, BayStack access points can be overlapped to provide load-balancing services and higher throughput.

While the access point management is somewhat weak, the setup and management of the PC Card clients are exceptionally good. Installing drivers and assigning an IP address to a card is a snap, and the extra utilities (especially the detailed Site Survey utility, for determining how many access points you need and where they should be located) are quite good. Overall, you should be able to get up and running with a BayStack Wireless LAN quickly and relatively painlessly. It's also simple to build an ad hoc network without an access point, if you want to share files between two Windows 95 notebooks on the train to work.

The BayStack includes a neat security feature that lets you allow and deny access on a card-by-card basis, by designating media access control (MAC) addresses.

Nortel's manuals are fair, often showing you screen shots of dialog boxes but not explaining what they do. However, the Planning Guide offers some good advice on building large wireless LANs.

Despite relatively poor performance and other flaws, the BayStack 660 came out on top of this comparison thanks to good range and exceptional client manageability. It's a good product for sites where blazing throughput is not a concern, but ease of use is critical.

ScoreCard	Performance 30%	Range 30%	Management/ administration 20%	Interoperability 10%	Security 5%	Documentation/ online help 5%	Total score
Nortel BayStack 660	5 x .30 = 1.5	7 x .30 = 2.1	8 x .20 = 1.6	7 x .10 = 0.7	7 x .05 = 0.35	6 x .05 = 0.30	6.55
Cabletron RoamAbout 2400	8 x .30 = 2.4	6 x .30 = 1.8	5 x .20 = 1.0	7 x .10 = 0.7	6 x .05 = 0.30	4 x .05 = 0.20	6.40
Lucent WaveLAN	6 x .30 = 1.8	6 x .30 = 1.8	6 x .20 = 1.2	8 x .10 = 0.8	7 x .05 = 0.35	6 x .05 = 0.30	6.25
Aironet PC4800	9 x .30 = 2.7	6 x .30 = 1.8	3 x .20 = 0.6	6 x .10 = 0.6	7 x .05 = 0.35	3 x .05 = 0.15	6.20

Individual category scores are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score.**

An old standard

Lucent has been providing wireless networking in the form of its WaveLAN product line for more than seven years. However, with middling performance and weak management tools, the latest WaveLAN product fails to stand out.

Performance was a bit disappointing, with a 1.15M bit/sec throughput at 32 feet. However, throughput held up well at 70 feet, falling only to 1.11M bit/sec. Range was 80 feet, fair for this comparison. The card reconnects automatically after reentering the coverage area. Lucent also markets a $95 WaveLAN Range Extender Antenna, a bulky device that plugs into the the PC Card on your laptop or the access point. Using the antenna improved signal strength considerably at short ranges but had no effect on the ultimate range of our LAN.

Performance/range summary*

	Throughput at 32 feet	Throughput at 70 feet	Terminal range
Nortel BayStack 660	1.11M bit/sec	0.97M bit/sec	88 feet
Lucent WaveLAN	1.15M bit/sec	1.11M bit/sec	80 feet
Cabletron RoamAbout	1.35M bit/sec	1.37M bit/sec	75 feet
Aironet PC4800**	2.84M bit/sec	2.22M bit/sec	75 feet

* Through heavy concrete and steel, with substantial electronic interference

** Proprietary transfer protocol

Lucent provides 10Base-T and 10Base-2 interfaces on its WavePoint-II access point. Be careful when working with the WavePoint-II: its metal construction left our test area badly scratched.

The access point setup utilities are more of a hassle than competing products, making WaveLAN network configuration an hours-long, tedious affair. Of particular concern was a frequent problem with the access point management software timing out in the middle of uploading or downloading settings to the antenna unit.

We also found WaveLAN's client-based utilities to be less friendly than Nortel's, although they get the job done. Advanced setup options are cleanly implemented, and security by MAC filtering is supported.

Part of the usability problem stems from the WaveLAN manuals, which are like working with bad translations from some other language. The information is there if you dig long enough, but finding it is a struggle. Online help and support are better, consisting of well-organized documentation and driver updates.

Of special note with the WaveLAN product is its broad support for numerous operating systems, including MacOS. You can also add a second PC Card to the access point for extra bandwidth, a feature unique among the products in this comparison.

Still, working with the WaveLAN products can try your patience, and the fact that we had to send the first batch back to Lucent because they didn't work did not encourage us.

Cabletron . . . without the cable

Cabletron's RoamAbout 2400 wireless LAN is high-speed hardware without many usability amenities.

While the RoamAbout access point came from the company's acquisition of Digital's network division, the RoamAbout PC Card is clearly an OEM version of Lucent's WaveLAN. The two PC Cards function identically and even work with each other's drivers. They also use the same client management software and an identical external antenna can be attached to either.

We were surprised when we put the RoamAbout system to the throughput test and it performed better than the WaveLAN. At 32 feet, the RoamAbout turned in a top-flight 1.35M bit/sec performance. Throughput held up remarkably at 70 feet, even when the signal had noticeably downgraded, turning in a best-of-show 1.37M bit/sec. Range topped out at 75 feet, the lowest in this comparison, but not by much. Roaming and reconnecting worked well.

The RoamAbout access point is a bizarre device. The design is awkward and requires that you mount it on a wall or balance it precariously on one end. You have to connect cables to three of the six faces of the unit, making the balancing act all the more difficult. The hardware supports 10Base-T and 10Base-2 connections.

Cabletron's management application, RoamAbout Access Point Manager, is on par with applications from other vendors. If you happen to have a Digital hub, you can use its centralized management utilities, and you can manage the access point via SNMP.

On the downside, the RoamAbout access point has vanilla security features — protocol filtering is supported, but MAC filtering is not.

While performance was good, we can't say the same about the documentation. The access point manuals often don't match the setup screens. Online help is nothing more than product brochures. Wireless newcomers will quickly find themselves lost.

All told, weaker security options, out-of-date docu-

NOT STANDARD, BUT NOT BAD

If you haven't already invested in wireless LAN equipment, you probably don't care about wireless interoperability. In that case, you might want to look at RadioLAN, a wireless LAN that offers high speed at a low cost but doesn't support the 802.11 standard.

RadioLAN's wireless offering is based on a proprietary 5.8-GHz spectrum that promises 10M bit/sec performance, up to five times the speed of 802.11 products — at least in theory. While we never saw performance approaching 10M bit/sec, we did achieve 4.39M bit/sec at a distance of 4 feet from our access point. But moving away from the access point resulted in throughput plummeting, with performance dropping to 1.88M bit/sec at 32 feet with an average of only 30% of data frames making it through.

RadioLAN comes with an enormous antenna, which is vulnerable to the slightest movement. A few degrees of tilt can be the difference between a solid connection and none at all.

While RadioLAN's performance may seem comparable to the other products, it's actually about 50% better than average 802.11 performance, at least within the 32-foot range. With additional access points to broaden the coverage area, it should approach 4M bit/sec. However, we lost our signal at only 57 feet, despite the enormous antenna. Clearly, this product is inappropriate for large buildings, unless you intend to invest heavily in access point hardware.

RadioLAN's PC CardLINK is a simple PC Card similar to the other wireless products we tested, but you must also attach a large external antenna to the card, then fix it to the lid of your laptop with Velcro.

Installing the PC CardLINK client drivers and configuring the card is simple. However, compared to the other products in this comparison, the site survey and diagnostic software was meager.

Despite some sloppy manuals, setting up a RadioLAN network was a breeze, as the setup and IP assignment process was considerably easier than with the other products we tested. In fact, you set up the access point from software on a diskette and further configure it through a Web-based management utility, meaning you don't have to install any software to manage the BackboneLINK access point. Media access control address filtering is built into all units.

At $449 for a PC CardLINK and $999 for BackboneLINK, RadioLAN is the least expensive wireless LAN product we tested. Encryption-enabled versions are available at a slightly additional cost.

While RadioLAN has its substantial weaknesses, in the short haul, you simply won't beat its wireless performance.

— Christopher Null

mentation and text-based setup combine to make Cabletron's RoamAbout a poor choice for wireless newcomers. However, for experienced professionals, its top throughput makes it an attractive choice.

The not-so-friendly skies

Straight out of beta comes the Aironet Wireless Communications PC4800 Turbo DS Series 11M bit/sec adapter. While remaining compliant with the 802.11 standard, the PC4800 promises 11M bit/sec throughput at short range when connected to an Aironet access point. Our tests with the PC4800 clocked maximum throughput at 2.84M bit/sec at 32 feet and 2.22M bit/sec at 70 feet. Range topped out at 75 feet.

More Online

FIND IT DocFinder 1421 ON FUSION

Visit Network World Fusion for a discussion of the IEEE 802.11 standard.

www.nwfusion.com

How does Aironet's wireless card command roughly twice the performance of its competitors? The trick is in a proprietary transfer protocol layered on top of the 802.11 standard that Aironet boasts can realistically support traffic at up to 6M bit/sec under the right conditions.

Aironet's AP4800 access point wins some points as the only access point we tested that doesn't require a PC Card to operate. It also supports 10Base-2, 10Base-5, 10Base-T and token-ring connections, and has the most stylish design in this group, with snazzy dual antennae.

Setting up the PC4800 and AP4800, however, was an exercise in frustration. For starters, the AP4800, like the Cabletron RoamAbout, requires an ASCII console for setup. But to make matters worse, rather than using a standard null modem cable, you need a nine-pin male-to-female serial cable to hook up to your administration station. This sent us off to dig through the supply closet for the right wires. After the unit is configured it can be modified through a telnet or HTTP session. We thought Aironet's client-based software also needed major work to enhance its functionality and usability, but overall, the management tools got the job done.

Installing the PC4800 PC Card in our test laptop was even more frustrating. By default, the PC4800 is set to work in 1M bit/sec mode only. You have to dig around in the network configuration to find the appropriate setting for high-speed access.

Digging through the console utilities reveals some interesting options, such as password security, SNMP support and built-in packet filtering, but you won't find these documented anywhere. The slim manual isn't much help. A mere two pages are devoted to configuring the access point, and the vast majority of the unit's settings are completely undocumented. Online help is nonexistent.

Aironet's PC Card will work with 802.11 access points and vice versa; of course, they are limited to 802.11 throughput, which we clocked at an average of 1.28M bit/sec at 32 feet. That puts Aironet just behind Cabletron, the standards-compliant speed leader, but its severe manageability and documentation problems leave us hesitant to recommend it. The fact that you'll also spend almost twice as much on an Aironet wireless LAN than on any of its competitors is not a point in its favor, either.

Null is the co-author of the upcoming Network Administrator's Reference *(Osborne). He can be reached at null@sirius.com.*

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Presented by Mark A. Miller, P.E., DigiNet Corporation

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Stocking up

An employer is trying to lure you with stock options: Here's how to decide whether to take the deal.

BY LORETTA W. PRENCIPE

Steve Schultz of DigitalNation hopes these special silver dollars will earn him a mint of company stock.

STAN BAROUH

Steve Schultz has four silver dollars tucked away in a safe-deposit box. But these are no ordinary coins. Each year, he earns a specially marked coin from his employer as part of a unique stock option plan.

Schultz, 25, is vice president of Internet services for DigitalNation, an ISP in Alexandria, Va. In less than one year, he'll be able to redeem the coins for $2,500 or 5,000 shares of company stock. And if DigitalNation goes public, there's no telling what those shares may bring on the open market.

Stock options are hot, hot, hot. Network professionals with Amazon.com dollar signs in their eyes gamble by taking jobs at start-ups with unknown potential. The trick is determining what stock options may be worth and how an offer compares with your current compensation package.

Romain Agostini did his homework before he left a good job to enter the stock option sweepstakes. As the network administrator for Stanford University's Linear Accelerator Center, Agostini took advantage of free tuition to earn a degree in engineering management and amassed a tidy sum in his 401(k) plan. Last fall, the budding entrepreneur took a job as business development engineer with ClickNet Software in San Jose.

Agostini used an online stock options projection calculator to compare his overall compensation package at Stanford to the offer from ClickNet. Developed by electronic recruitment firm PeopleScape, the tool was handy for reducing both packages to current net value.

"It's easier to compare the various parts — the 401(k) to the stock options and bonuses — when you bring them down to the same common denominator," Agostini says.

He ran projections several times, calculating various return rates over different time spans for his compounding 401(k) and ClickNet's unproven options. His calculations indicated that ClickNet's offer would likely be more lucrative in the long run. However, Agostini concedes that projections are just that — projections.

"It all depends on your confidence with the start-up," he says.

Weighing your options

As Agostini found, you need to factor in a company's future plans and the option terms when you evaluate stock options. Be well informed on both counts, suggests Robert Fields, a tax attorney with New York law firm Greenberg Traurig.

Stock option plans have their own language, including terms such as vesting, forfeiture, nonqualified options, incentive stock options and reload options, to name a few. Every company's plan is a bit different, so you've got your work cut out for you. Fields suggests you take the time to learn the basic components of any plan.

The first area to examine is vesting, which influences almost every other aspect of a stock option plan. "Are you fully and immediately vested in the options, or [are you vested] over a period of years? Most plans have a three-, four- or five-year vesting schedule," Fields says.

Because employee retention is key to a company's success, most plans include a variety of forfeiture provisions. If you leave the company before you're fully vested, you walk with nothing. And if you're fired for cause, you'll probably lose your stock options. Some companies throw a monkey wrench into the vesting schedule by stipulating that corporate financial goals must be met before employees can exercise options.

Some firms offer stock to their employees at an attractive price, but producing the cash is difficult for many employees. That's why some companies include sweet provisions, such as reload options, to lighten the financial burden on its staff. With reloads, cash isn't king. Firms allow their employees to use previously owned stock to buy a lower priced option. For example, if the stock you own outright is worth $50 and you can pick up your options for $25, you can trade the one share of $50 stock for two shares of your options.

Schultz didn't join DigitalNation for its stock option plan, but he was intrigued. He says the plan is a simple way of giving employees an incentive to stay, and it lets them invest in the company. "It's also a good indication of the way the company is run," he says.

For now, the Internet guru is holding onto those silver dollars and counting the days until January 2000 when he can trade them in for DigitalNation stock.

Prencipe is a freelance writer and attorney in Springfield, Va. She can be reached at LWPrencipe@excite.com.

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- A glossary of stock option terms.

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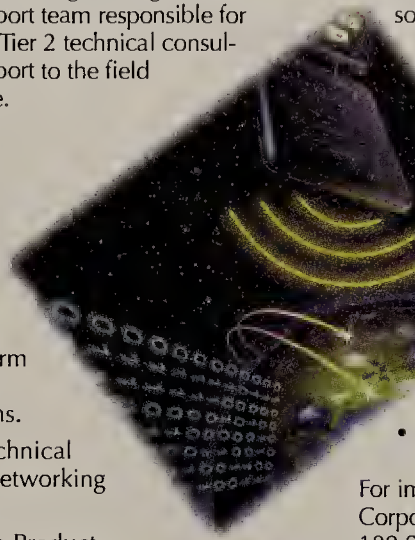

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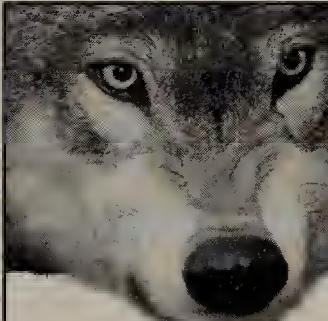

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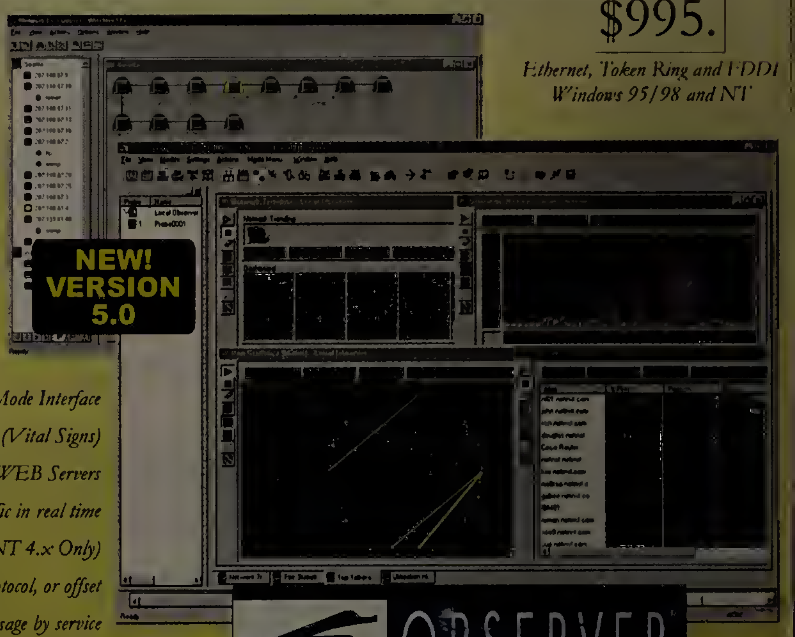

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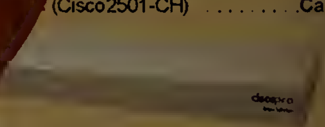

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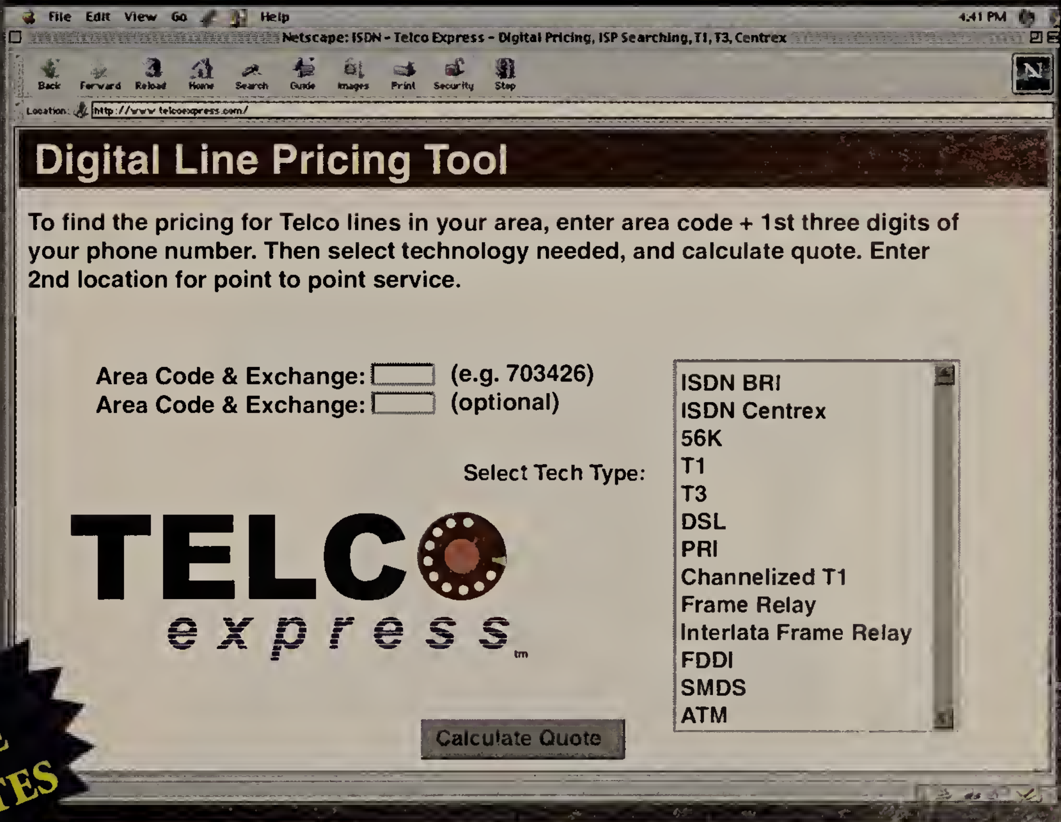

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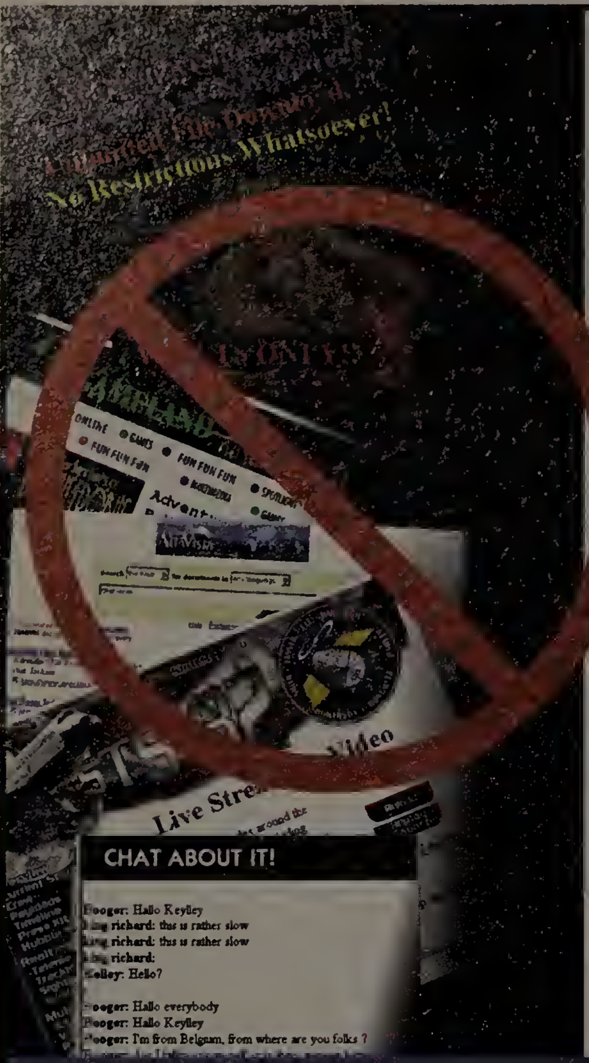
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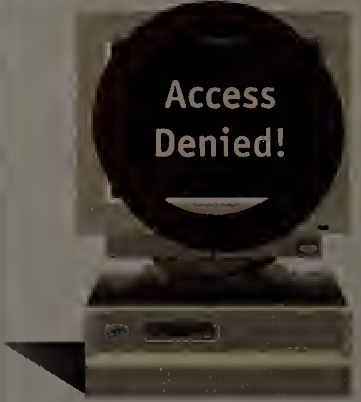

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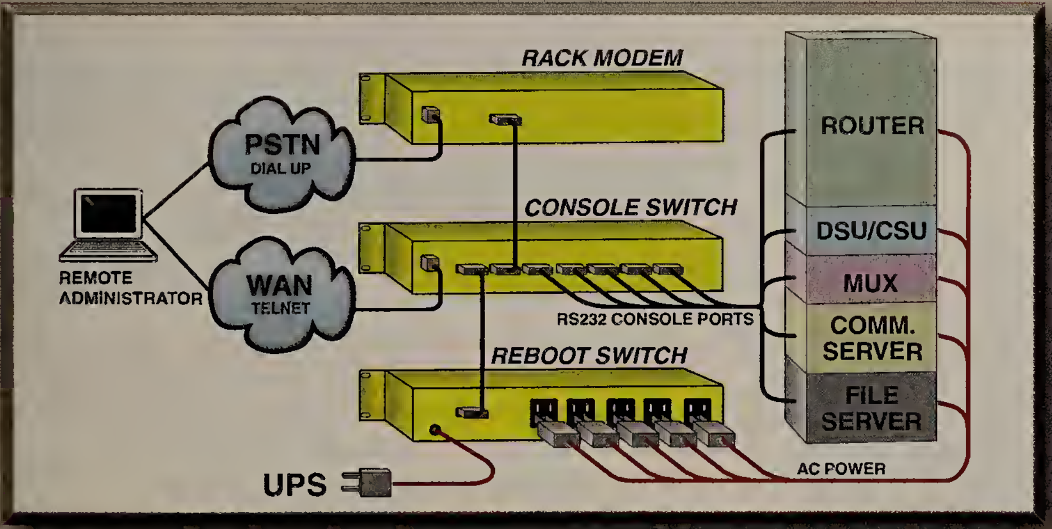

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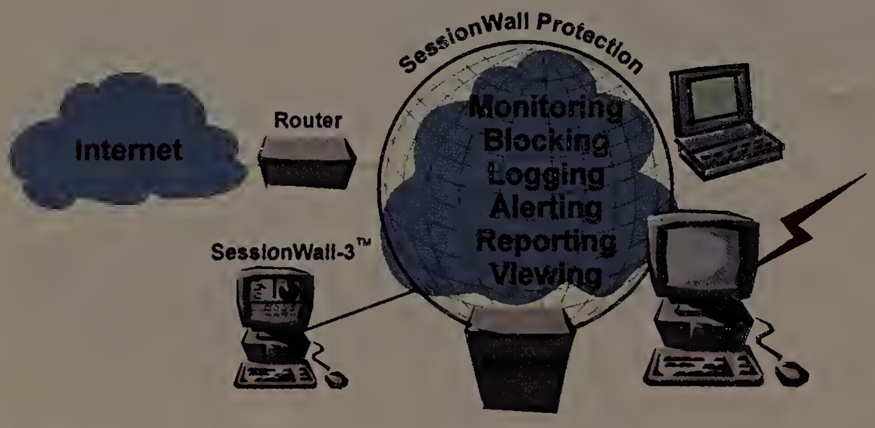

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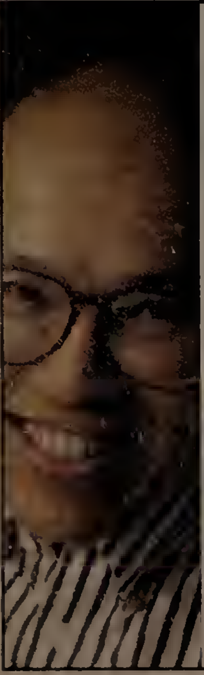

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EDITORIAL INDEX

A
Aironet 43
AT&T 25,34
B
Bell Atlantic 25
C
Cabletron 1,17,43
Compaq 29
D
Data General 20
E
EarthLink Network 25
EMC 10
Eolas Technology 6
E-Trade Securities 6
H
Hewlett-Packard 8
I
IBM 1,17
Intel 17
Internet Security Systems 29
K
Kentrox 20
L
Lucent 43
M
MCI WorldCom 6,25
Microsoft 6,14
Monterey Networks 8
N
New Access 8
Nortel 43
Novell 1,6
O
Oracle 29
P
PSINet 25
Puma Technology 8
Q
Qwest 6,26
S
SightPath 14
T
TeckChek 6
V
Vixel 17

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Advertiser	Reader Service#	Page#	URL
AbirNet	309	52	www.abimet.com
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Computer Associates	29	7	www.cai.com
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Fujitsu	22	42	www.netprism.com
IBM		18-19	www.ibm.com
Internet Commerce Expo		36	www.iceexpo.com
Kensmen Corp	298	50	www.kensmen.com
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MCI Communications	31	10-11	www.mci.com
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Microsoft Corp		2-3	www.microsoft.com
Network Instruments	290	48	www.networkinstuments.com
Network Technologies	272	49	www.nti1.com
Nortel Networks	26	4	www.nortelnetworks.com
RAD Data Communications	27	41	www.rad.com
Raritan Computer	314	52	www.raritan.com
Timeplex Group	239	52	www.timeplex.com
USA Communications	321	50	www.teleboot.com
UUNET		21	www.uu.net
Visual Networks Inc	28	15	www.visualnetworks.com
West Hills LAN Systems	297	48	www.west-hills.com
Western Telematic Inc	250	51	www.wti.com
WinProxy	229	50	www.winproxy.net
Xylan Corp	23	59	www.xylan.com

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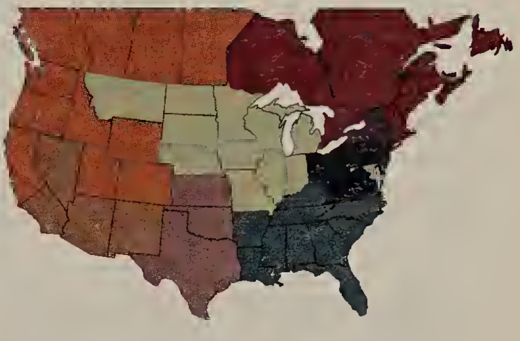

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IBM,

continued from page 1

recent ComNet/DC '99 conference in Washington, D.C. "We feel that only Lucent has anywhere near the capability to offer end-to-end products and policy control that we will have."

IBM executives said the company over the next 10 months will unleash a family of Ethernet and Gigabit Ethernet campus and backbone switches built with the firm's Prizma ATM chip and other IBM Application Specific Integrated Circuit (ASIC) technology. The moves will let users build big high-speed Ethernet backbones with ATM QoS capabilities.

Prizma, developed in IBM's Zurich Research Lab, is a 28G bit/sec ATM chip at the heart of the company's ATM switches. IBM would not say how many boxes will make up the new family.

In addition, IBM will add policy-based management features to the software running on all of its major switch products — including the 2212 router, 827X switch/router families and 8265 ATM switch.

To help enable policy-based management, IBM will add Lightweight Directory Access Protocol (LDAP) support across its line of net gear. This will let IBM switches access user profiles and implement QoS policies from any LDAP directory in an enterprise network.

With these initiatives, IBM joins Cisco, 3Com and other communications bigwigs that offer policy management for their routers and switches. To differentiate its products from those of competitors, IBM plans to use the high-throughput capacity of its Prizma chip in combination with QoS features, such as guaranteed bandwidth, best-effort delivery and priority queuing.

IBM certainly has a lot to prove in the Ethernet arena, but some analysts were cautiously optimistic about the company's chances.

The policy management initiative will let IBM sell to its installed base of Token-Ring users migrating to Ethernet, and also could be attractive to non-IBM customers, says Sam Alunni, president of Sterling Research, a consultancy in Sterling, Mass.

IBM believes it can make highly competitive Ethernet products, but in the past, the company didn't feel the need to offer an alternative to its Token-Ring line.

IBM has already begun to implement some of its Ethernet/ATM strategy. The firm recently announced the 8274 Nways LAN RouteSwitch — a Gigabit Ethernet switch that will be available as a blade inside IBM's 8265 ATM switch. This combination will let users link Gigabit Ethernet LANs to high-speed ATM backbones (*NW*, Jan. 25, page 27).

IBM has also promised to fill out its Ethernet switching family. In that vein, the company in two weeks will announce two mid-size Ethernet switches that will fit between the high-end 8274 and low-end 8275 desktop Ethernet switches. ◪

"We expect to grow our Ethernet business at three times the industry rate this year."

Rob Zimmer, director of strategy, IBM's Networking Hardware Division

Monster.com,

continued from page 1

earned $40 million last year. "It's one of the best decisions that we've made."

However, at least one Internet expert questions the long-term revenue returns on such an enormous investment.

"Four million dollars is a lot of change for a single event," contends Rob Enderle, an analyst with Giga Information Group in Santa Clara, Calif. "A lot of the reason to do the Super Bowl ads for the smaller companies is to say, 'Look at us, we're on the Super Bowl,' as opposed to really thinking through the business justification."

Monster.com executives beg to differ, even though the Super Bowl buy has consumed 15% to 18% of this year's marketing budget.

The Web site hosts more than one million resumes and lists 173,000 jobs. Prior to the Super Bowl, it had been averaging five million visitors per month and 600 job searches per minute, according to Taylor. The latter measurement is considered most crucial.

"At 10:30 p.m. or 11 p.m., after the Super Bowl was over, we were doing almost 2,900 job searches per minute," he says. That spike leveled off to 1,500 later in the week, still 400 per minute more than the pre-Super Bowl high.

Prepping for the onslaught involved seven Monster.com IT staffers, led by Director of Development Jonathan Lynch, who three days after the big test was promoted to vice president of IS for research and development.

"One thing I've learned in the past year doing all this work on the World Wide Web is that you can never really overprepare for something like this," Lynch says. "We figured out what we would need and then we doubled it."

In the month prior to the Super Bowl, Monster.com installed 30 top-of-the-line Dell PowerEdge 6300 servers to more than double a base of 20 Web, database and back-end messaging servers. The additional T-3 connection more than tripled the capacity of the company's 12 existing T-1s, giving Monster.com a total of about 60M bit/sec of bandwidth to the Internet at its Indianapolis facility.

Consumption peaked at about 35M bit/sec just after Monster.com's ads were televised.

"It's really important to keep [use of available] bandwidth to the Internet below 50%," Lynch says. "Once it starts going above 50%, you start getting a lot of retransmissions and it's just not good for the servers."

The company has already ordered another T-3.

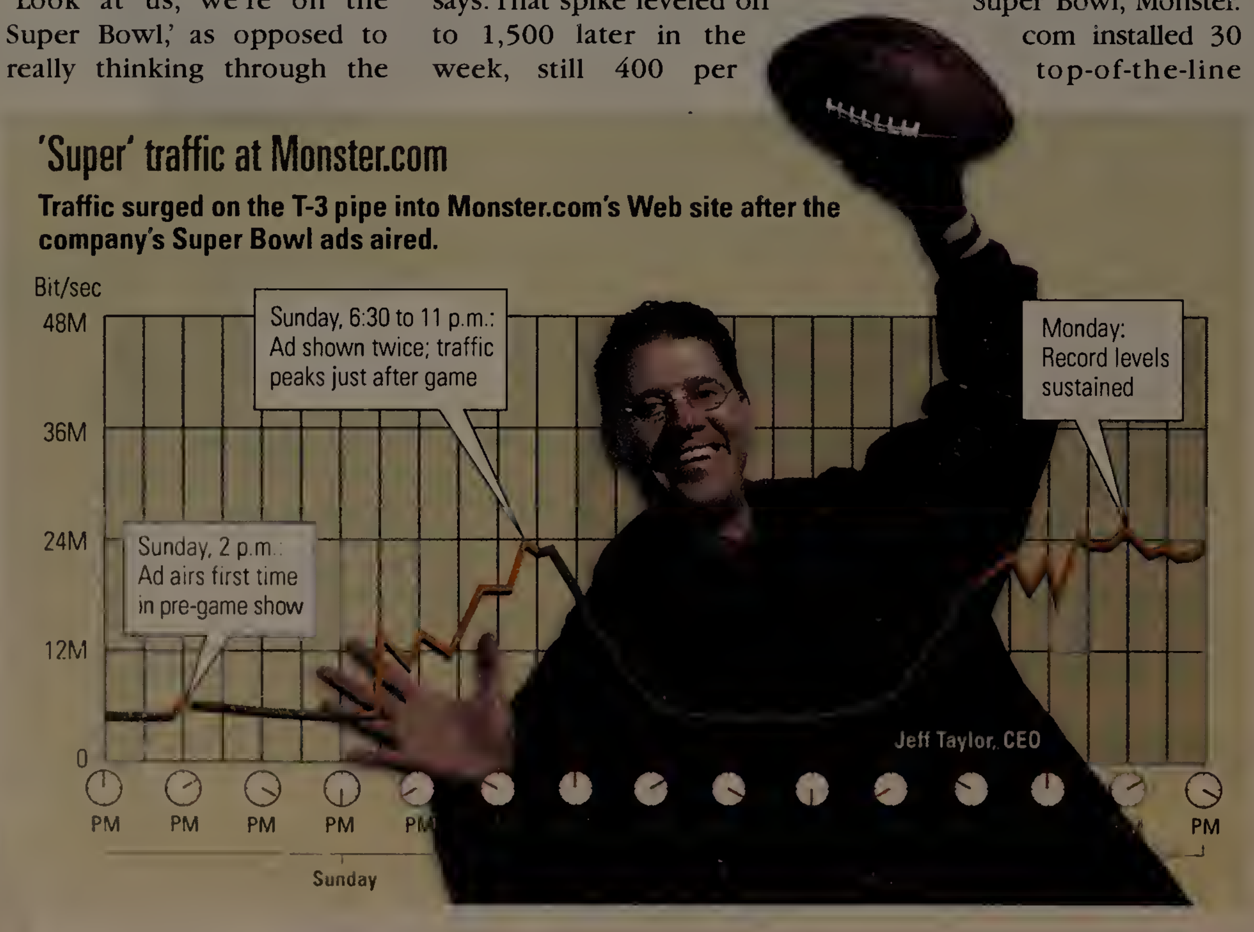
In addition to the hardware and bandwidth, Lynch's team upgraded the company's network load-balancing capabilities with a pair of Hydra 5000 hardware/software appliances from HydraWeb of New York.

"The Hydra 5000 offers us up to three million concurrent connections," Lynch says. "We certainly didn't want that to be the bottleneck, which it's not going to be with that many available connections."

Monster.com wasn't alone in peddling online job searches Super Bowl Sunday. A fledgling competitor, Hotjobs.com, spent about $2 million for 30 seconds of airtime, two new servers and part of a T-3 connection.

While Hotjobs.com reported a fivefold increase in traffic

See **Monster.com,** page 57



'Super' traffic at Monster.com

Traffic surged on the T-3 pipe into Monster.com's Web site after the company's Super Bowl ads aired.

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Cabletron,

continued from page 1

says it would make a fine acquiree.

"Of the 300 vendors we compete with, we've got the third-highest sales volume," says Cabletron CEO Craig Benson, adding that the company will unveil "bold new plans" for a turnaround at the end of this quarter. "Somebody is buying our products. I know for a fact that there's interest around Cabletron."

Cabletron was a high-flyer earlier this decade, one of the vaunted "Big Four" in the LAN industry. But as the company struggles through its current financial malaise, it is stuck in suspended animation while the remainder of the Big Four — Cisco, 3Com and Bay Networks, now a division of Nortel Networks — hurtle through the stratosphere toward Planet Internet.

But Cabletron claims it is keeping — if not setting — the convergence pace.

"We started this two years ago," Benson says. "We have the only converged network in the datacom [vendor] world."

Benson says Cabletron not only has a converged network internally but also has shipped products to customers as the basis of their converged voice/data networks. Cabletron has also shipped 10 million nodes that are being used in policy-based networks, another hot area.

The company's problems hit like a meteor late last year, when it lost $21.2 million — 12 cents per share — on sales of $330 million for its third quarter of fiscal 1999. Cabletron attributed the loss to a difficult transition from sales of shared-media hubs to LAN switches, the loss of Nortel as a customer and slow sales through the Compaq/Digital channel.

Wall Street analysts expected a profit of 11 cents per share, and the shortfall prompted some to call for a change of leadership at the company (*NW,* Dec. 7, 1998, page 1). At the very least, Cabletron said it would keep analysts updated on its recovery.

Progress report

The company last week kept its word with the conference call, which came a month away from the end of Cabletron's fourth quarter and fiscal 1999.

But despite the progress report, analysts say Cabletron's future will be as an independent company that may survive, but will not thrive.

For the near term, Cabletron will continue to grapple with a legacy in shared-media hubs, a shrinking enterprise market and questionable acquisitions.

These issues will crimp Cabletron long-term by keeping the company from moving quickly to capture new markets in a rapidly moving industry. Ultimately, the industry will move away from Cabletron, analysts say.

The company will remain independent not because it wants to but because it offers little value to potential suitors, analysts say.

Even though its stock is down and it could be acquired for a fraction of the cost of recent acquisitions, Cabletron has virtually no products for the hot service provider market; it's losing to Cisco in the enterprise; and it has a lot of operational and management baggage.

Pertinent points

Cabletron's turnaround hinges on:

- Showing revenue growth and favorable revenue-per-employee figures this summer.
- Convincing CIOs that Cisco is not the best business choice for networking.
- Increasing revenue through Compaq, which is now Cabletron's largest customer.
- Discontinuing some slow-growth product lines.
- Moving from direct sales to sales channels.

D'Auguste: We beat Cisco on technology.

Benson disagrees with the perception that Cabletron has nothing to offer service providers. Cabletron switches are installed in America Online and UUNET networks; and cable service provider Adelphia just became a Cabletron customer within the past two weeks, he says.

Financially, Cabletron says it will start to turn things around this summer. Users and company watchers should look for revenue gains and increased revenue per employee in the first and second quarters of fiscal 2000, which end in May and August, respectively, according to John d'Auguste, president of operations.

D'Auguste made his remarks during last week's conference call. Benson did not participate in the conference call "to show we've got some talent in Cabletron that's not got my name."

D'Auguste outlined Cabletron's new ad campaign and Compaq relationship, but he only touched on product-narrowing plans.

The ad campaign will be targeted at CEOs and chief information officers (CIO), and will question whether the purchase of Cisco equipment instead of Cabletron gear makes good business sense. The campaign will begin in March.

"When we compete against Cisco, we win on a product-to-product comparison," d'Auguste claims. "When we lose, it's a 'Cisco is a safe solution' choice, and it's a CIO and a CEO decision vs. a technology decision. The perceived safe solution may not necessarily be the best business solution."

The Compaq factor

The Compaq agreement will be completed in 30 to 40 days, d'Auguste says, and will honor the same three-year, $1 billion arrangement that Cabletron and Digital hammered out in late 1997. Compaq purchased Digital in 1998.

"Our [current] quarter will be the first full quarter of shipping the SmartSwitch Router and the SmartSwitch 6000 in rebranded format for Compaq," says David Kirkpatrick, Cabletron executive vice president of finance. "We anticipate a pretty strong quarter on both those product sets within Compaq."

Benson was a little more passionate about the Compaq relationship.

"Anybody that thinks we're not going to be around ought to talk to Compaq because they're signing a multiyear agreement for an awful lot of stuff with their name on it that they'd be foolish to do if they believed any of this [fading away] stuff," he says.

Analysts are still unclear, though, when Cabletron will see its share of money expected from sales of its equipment through Compaq. Cabletron expects its share to total about $83 million per quarter.

"They were very vague, they didn't really know yet," says Scott Heritage of Warburg Dillon Read in New York.

Cabletron was also vague about which products it will kill off.

"We are looking at all aspects of the company, and when we get closer to a decision we'll communicate that," d'Auguste told analysts.

A Cabletron spokesman says the company will be discontinuing older gear, such as MMAC hubs and switches, and transceivers.

Where's the beef?

Analysts say the progress report currently lacks meat.

"I still think the whole question is, 'Where's The Beef?' " says William Becklean of Tucker Anthony in Boston. "I think the proof of the pudding's in the May quarter. If these guys can't show that they can drive top-line revenue growth, then you start to wonder if they ever can."

"There's a certain lack of stability at this time to give anyone confidence that this ship is being effectively turned around," says Andy Schopick of Nutmeg Securities. "This is more than just a transition from shared-media hubs to LAN switching."

Schopick says Cabletron has made a series of costly acquisitions that have not contributed much to the bottom line. He says the purchase of Digital's Network Products Group is one example.

"In view of the subsequent events, it looks very dubious, very iffy as to how smart a transaction that was," Schopick says.

Benson disagrees.

"We did the Digital acquisition with the hopes of becoming much more channel-friendly; it's really helped our channel mix dramatically," he says.

As for Cabletron the acquiree, "Who would want to pony-up to the bar with them?" asks Craig Johnson, principal of Pita Group in Portland, Ore. "At one level it would be an opportune time because it's hurting so bad; the only other theory is if [the buyer is] a U.S. firm, it would be almost impossible for them to sell [the acquisition] to Wall Street."

Benson believes analysts are especially harsh on the company because they wanted more substance in last week's conference call. ◪

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Monster.com,

continued from page 56

after the game, its upgraded network buckled under the strain, causing some downtime and delays significant enough to prompt an online apology from CEO Richard Johnson.

"We're the only Internet site that advertised on the Super Bowl that *didn't* crash because of the added traffic," boasts Bill Warren, Monster.com's president.

Water cooler buzz and post-game media chatter are also important measures of a Super Bowl ad's success, experts say. Monster.com appears to have scored well here, too.

"Part of the challenge is [getting consumers to] remember the ads, as well as what they were selling," says Craig Koller, a multimedia designer for CCH, Inc., in Torrance, Calif. "I remember the Monster.com ad and liked its Dilbert-esque appeal."

The ad was shot in black-and-white and featured a series of children saying things like, "When I grow up . . . I want to be a yes-man," and " . . . forced into early retirement." The message: Find a better job at Monster.com.

Taylor says it's too early to know whether the lasting impact of the Super Bowl ads will justify making a similar investment next January. But he does sound like a probable repeat customer.

"At $53,000 a second, why not?" Taylor asks. ◪

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Backspin

Hacking away, and just barely trying

Ever wonder how hard it is to become a hacker? I can tell you firsthand it's probably easier than you may think.

It all started when I was testing Symantec's Web clients for pcANYWHERE on my office network. I downloaded the software from Symantec's site and ran it. Wonder of wonders, it worked perfectly — way cool and very impressive.

As I was about to leave for a conference I thought it would be useful if I could use pcANYWHERE to access my machines while I was away. So I decided to test it by dialing up an ISP and looping back to my office via my digital subscriber line connection.

MARK GIBBS

Imagine my surprise when I ran the applet and was given a list of six pcANYWHERE clients of which only one was mine.

Aha! Let's see if anyone forgot to set a password on his or her copy. Lo and behold, there it was, 2 a.m. and one copy was unsecured. Suddenly I was observing the screen of someone else's machine! Wild.

The owner was in the process of using a speech recognition system to dictate a letter to his girlfriend (no, nothing very steamy), and there at the bottom of the screen was his name (we'll call him Ralph).

I think the reason I could see his name was that it was part of the training data loaded into the speech recognition system. I thought I should let him know he had a security problem, so I put the cursor in the window his spoken words were appearing in and typed "Yo, Ralph." Nothing. He did not notice. I tried changing windows to Notepad but the speech recognition system switched back to the first window.

So to get his attention, I switched to my word processor, typed a long message, copied it to my clipboard, copied my clipboard over to his clipboard, and pasted the message into his active window. This time he noticed. He immediately pulled the plug on his computer, and the connection vanished.

I felt bad. I'd freaked Ralph out, and there was no opportunity to explain. So how to find him? Well, I knew his IP address but that was not much use so I went searching. Luckily he had an unusual last name, which made life easier.

I went to several search engines, including InfoSeek and AltaVista, and I found lots of dud leads (dead links and near misses). But eventually I hit pay dirt. I found a Web site and discovered what Ralph looks like (he has a picture of himself eating lobster) and that he is a scriptwriter. Then I went to switchboard.com and found him there, too.

From Ralph's Web site I knew where he'd been on holiday and some other trivia of his life. From switchboard.com I had learned Ralph's street address, telephone number and e-mail address. It had taken me all of 15 minutes.

So trying to be a nice guy, I sent him e-mail explaining what had happened, that I hadn't done anything to his PC, and noting that he should password-protect his copy of pcANYWHERE.

Next day there was no reply, so I called him. We had a non-conversation.

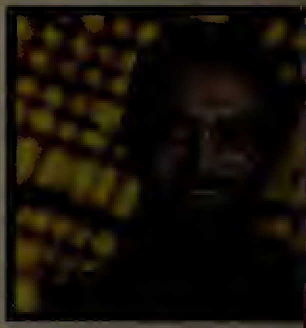
I explained who I was ("Uh-huh," he said), I assured him that I wasn't a hacker, ("Uh-huh"), that I hadn't done anything to his PC ("Uh-huh"), and that he should secure his system ("Uh-huh"). I explained that a hacker could have had a field day ("Uh-huh") and, well, I hardly got a response. Ho-hum.

It was such a simple hole in his system and one that I could have exploited without him having a clue what was going on. On the other hand, he probably wouldn't have been of much interest to a real hacker. But what if Ralph had been your chief financial officer? That could lead to all sorts of infiltrations into your corporate network. Frightening.

I would never have guessed that being a hacker was so damn easy.

Incursions to nwcolumn@gibbs.com or (800) 622-1108, Ext. 7504.

'NET BUZZ



CHRIS NERNEY

A real power breakfast. You know you have power when:

- **Bill Gates** brags about having your name in his Rolodex.
- Your every inane utterance is treated as unsurpassed brilliance by a coterie of shameless sycophants.
- Your sycophants have sycophants.
- Someone is willing to pay $4,400 for the privilege of sharing a one-hour breakfast with you.

That last one happened recently to **Steve Jurvetson,** managing director of **Draper Fisher Jurvetson,** one of the most media-savvy and successful venture capital firms in Silicon Valley.

A breakfast meeting with Jurvetson was offered in a week-long online auction conducted by **eBay,** the red-hot Internet start-up whose stock performance these days can be tracked only by a NASA telescope.

eBay's auction was a charity gig, with proceeds going to the **Emergency Housing Consortium** of San Jose.

Top bidder for the Jurvetson breakfast was entrepreneur **Mark Hernandez,** an investor in online business **VaultReports.com,** which provides Internet career research and recruiting services for job seekers.

Hernandez' bid actually was topped by a $5,000 offer that came in too late, so Jurvetson agreed to do two breakfasts.

Now for the 'Net Buzz mini-interview:

Q: How does it feel to have your flesh peddled online?

Jurvetson: It's one of the more unusual feelings I can recall. It was a huge charge watching the price go up and up.

Q: How much would you pay to have breakfast with yourself?

Jurvetson: I don't know. I'm just delighted the charity's going to get this money.

Q: Will you buy me breakfast?

Jurvetson: (No answer)

Wired for wireless. For fans of wireless telephones, these are exciting times. Competition among carriers is forcing down prices of service plans and hardware, to the point where some analysts predict the fixed phone line may be obsolete within a decade.

But competing and incompatible wireless products have left many consumers frustrated. After all, knowing you need a special charger for your new phone and being able to find it in a store are two different things. One minute you think you're taking a quick trip to the local store, and the next you've embarked upon the retail version of a pub crawl, without the benefit of a stiff drink to calm your jangled nerves.

A Web site that debuts today hopes to take the anxiety and hard work out of finding the wireless phone products you need.

The site, **www.buywireless.com,** bills itself as The Internet Wireless Superstore and boasts specialized wireless products, including phones, batteries, cases, chargers and other accessories at discounts below retail prices.

Shoppers using BuyWireless.com can click on the image of the phone they use and get a list of every accessory that works with the phone, complete with descriptions and prices.

Scott Goldman, BuyWireless.com co-founder and CEO, says the site is "aimed at the tens of millions of wireless users like me who don't have time to shop at a retail store, search for the lowest prices or deal with the overwhelming complexity of choices."

The site also is targeting corporations that want to provide their employees with wireless technology at discounted prices, as well as wireless carriers looking to expand their product selections for subscribers. The start-up is located in Irvine, Calif.

Jurvetson isn't the only one who can play this auction game. 'Net Buzz is now accepting bids for a charity breakfast, with proceeds going to a home for wayward drones. To submit bids or your best Internet news, contact Chris Nerney at (508) 820-7451 or cnerney@nww.com.

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